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VOL. III.

1928.

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Wednesday, February 1st, 1928.

Mr. J. E. COLLIN, President, in the Chair.

*Obituary.*

The PRESIDENT announced the death of Mr. J. H. DURRANT, and a vote of condolence with his relatives was passed.

The death of Mr. G. BETHELL was also announced.

*Nomination of Vice-Presidents.*

The PRESIDENT announced that he had nominated Mr. R. ADKIN, Mr. H. M. EDELSTEN, and Mr. R. W. LLOYD as Vice-Presidents for the coming year.

*Election of Fellow.*

The following was elected a Fellow of the Society:—A. W. McK. HUGHES, 22, Stanford Road, Kensington, W. 8.

*Exhibits.*

*MANIOLA LUPINUS*, COSTA. A SPECIES NOT PREVIOUSLY RECORDED FROM FRANCE.—Captain A. F. HEMMING exhibited a series of *Maniola lupinus*, Costa, taken in France in the Department of the Var in August 1927, and communicated the following note:—

“When at La Sainte Baume (Var) from 7th to 14th August, 1927, my wife and I found what appeared to be a subspecies of *Maniola lupinus*, Costa. We collected as many specimens as we could find in good condition, intending to examine the male genitalia on our return to London. The species had evidently been plentiful, but at the time we were at La Sainte Baume many individuals were too worn to take. Altogether we obtained 11 ♂♂ and 22 ♀♀. I have since examined the male genitalia of these *Maniola* and there is no doubt that they are *M. lupinus*. No examples of *M. lycaon* were taken, and I doubt whether it occurs in this locality.

“The difference between the genitalia of these two species is even more marked  
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than is suggested by the figures given in Count Turati's well-known paper (*Nat. Sicil.*, xxi, pl. 7 (1909)). This is due to those drawings having been made from specimens in which the genitalia were not removed from the body. Only a part,

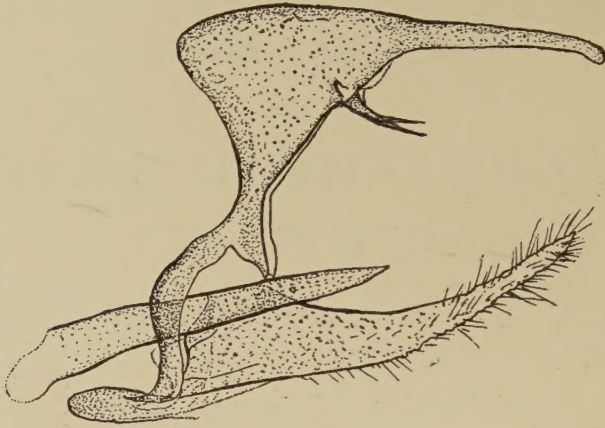


FIG. 1.—*M. lycaon analampyra*, Trti. Monte Sibillini, Italy.

therefore, of the structure is visible. The following are the chief points by which the genitalia of these species may be distinguished :—

—	<i>M. lycaon</i> , Rott.	<i>M. lupinus</i> , Costa.
Uncus.	Long, slender, almost straight throughout the greater part of its length, terminating in a blunt end.	Short, thick, strongly curved, and terminating in a sharp, slightly hooked point.
Lateral apophyses of the uncus.	Relatively short (barely a third of the length of the uncus), almost parallel to uncus, very slender throughout their length and terminating in a fine point.	Relatively long (fully two-thirds the length of the uncus), very stout, and massive at the base and terminating in a blunt point, upcurved towards the tip of the uncus.
Lateral process of ventrite for attachment of clasps.	Relatively long, triangular, apex simply pointed.	Shorter, roughly triangular, apex terminating in a sharp hook.
Saccus.	Relatively slight, with a marked constriction at the point of junction with the ring of the ninth abdominal segment.	Massive and of the same breadth throughout its length.

“*M. lupinus* has not previously been recorded from France, though in Western Europe it is known from Spain and Portugal (s.sp. *najera*, Fruhst.) and from the South of Italy (s.sp. *lupinus*, Costa). Nominotypical *lupinus* is the palest of all the described forms of the species. *Najera* is much darker. The examples from La Sainte Baume are intermediate between these two subspecies, to neither of which they are referable.



I propose for this subspecies the name **magdalena**, s.sp. nov. It is characterised as follows :—

“ ♂ *upperside*. Ground-colour dull brown, paler in shade than in s.sp. *najera*, with the result that the dark brown antemarginal border of the fore-wings is more distinctly seen; no yellow suffusion on the fore-wing such as is seen in s.sp. *lupinus*; hind-wings dark brown of the same colour as the border of the fore-wings.

“ ♀ *upperside*. Fore-wings dull brown, with well-defined yellowish rings to the two black spots. These rings are much larger than in s.sp. *najera*, but in none of the 22 ♀♀ taken does it form an uninterrupted band of yellowish as in s.sp. *lupinus*; disc of fore-wings with moderate yellowish suffusion; hind-wings of the same colour as the fore-wings, without any yellowish suffusion but with a well-developed darker brown antemarginal line.

“ ♂♀ *underside*. Similar to s.sp. *najera* except that the ground-colour of the hind-wings is not quite so unicolorous.

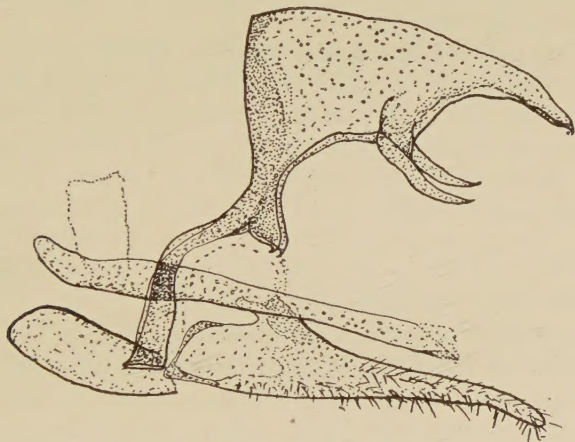


FIG. 2.—*M. lupinus magdalena*, Hem. ♂ Holotype. La Sainte Baume, Var, France.

“ Length of fore-wing : ♂♀, 23 mm.

“ *Habitat* : S. France, Dept. Var, La Sainte Baume.

“ ♂ Holotype. La Sainte Baume, 9.8.27. V. M. Hemming (Hemming coll. No. 21805).

“ ♀ Allotype. La Sainte Baume, 9.8.27. A. F. Hemming (Hemming coll. No. 21802).

“ Paratypes in Hemming coll. and in B.M. (B.M. Types No. Rh. ♂ 279; ♀ 280).

“ *M. lupinus magdalena* has probably only a very limited area of distribution in the south of France. The Oberthür collection contains no French specimens of this species.

“ The nearest locality from which *lupinus* has been recorded to the east of France is Florence, where Verity has taken it in the neighbouring hills (*Ent. Rec.*, xxxi, pp. 204–205 (1919)). Verity identifies his Florentine *lupinus* with the race figured by Turati under the name *intermedia* (*Nat. Sicil.*, xxi, p. 66, pl. 2, fig. 7 ♂, 8 ♀). Riley has, however, pointed out (*Ann. Mag. Nat. Hist.*, (9) viii, pp. 593–4 (1921)) that the true *intermedia*, Staudinger (1886), is the well-defined race

from Samarkand and Margelan, and with which *margelanica*, Turati (1909) (*l.c.* pl. 2, fig. 5 ♂, 6 ♀) is identical. The race from Tuscany cannot therefore be called *intermedia*. As I have not seen any specimens from this locality, I cannot say to what subspecies they should be referred. It is, however, possible that they may prove to be *magdalena*, in which case the area of distribution of that subspecies would be extended to the east by nearly 300 miles. Its southern limit would then only be separated by approximately 150 miles from the northern limit of s.sp. *lupinus*, which Turati records from Oricola in the Province of Rome."

IMPRESSIONIST COLOURING AMONG LEPIDOPTERA.—Dr. V. B. WIGGLESWORTH said: "It will not, I hope, be thought that this communication is intended to be of a merely flippant or trivial nature. That is far from being the case; for although the observations which I have to make may not be very original, and although, admittedly, I cannot myself see exactly where they lead, yet I feel sure that they do contain matter for reflection.

"The first example of impressionist colouring which I wish to show is familiar to everyone. The orange-tip (*Euchlœ cardamines*) belongs to the PIERIDAE; and it is well known that the PIERIDAE have a very restricted palette with which to produce their effects; for they have only, on the one hand, the black melanin pigment, and, on the other, the white, yellow and red uric acid pigments. Now as everyone knows, and as can be readily seen with a simple microscope, the appearance of green colouring on the under surface of the hind-wings in the orange-tip is an illusion produced by the admixture of black and yellow scales. That is a very simple example of the impressionist method.

"The other example which I have chosen is the familiar Indian leaf-butterfly (*Kallima inachis*). In this butterfly, when viewed at some distance from the eye, the under surface of the wing appears to bear a raised rib exactly like the mid-rib of a leaf. Yet when examined more closely, even without a lens, the illusion of relief entirely disappears, and what, at a distance, looked like a prominent rib is seen as three coloured lines—a pale mauve line, a green line and an orange line. The illusion of relief is given by the blending of the colours, and if the relative luminosity of the constituent tints is altered by viewing them, for example, through coloured glass, the illusion is destroyed, just as it is destroyed by looking too closely at the pattern.

"Now it is well known that in the work of the old masters the effect of recession and relief was attained by a monochrome painting with washes of pure colour superimposed. Towards the end of the last century the French impressionists, led by Claude Monet, abandoned the theory of light and shade and took to painting the shadows in colour, putting on the constituent colours of sunlight side by side and so adding greatly to the brilliance of their effects. Although the credit for this discovery is usually given to the Impressionist School, yet, in point of fact, not only was it practised by Turner in all his later work, but, like so many other things, was recorded in the note-books of Leonardo centuries before. And now we see that whoever was responsible for the colouring of these insects—Natural Selection, Orthogenesis, call Him what you will—was undoubtedly an impressionist of the very first rank!"



THE LARVA OF *MICROSPHINX PUMILUM*.—Mr. H. M. EDELSTEN communicated the following description of the larva of *Microsphinx pumilum*, sent by Mr. G. Edelsten, Vaalkraal, Sepani, Orange Free State.

"A freshly emerged specimen of *Microsphinx pumilum* was taken by me at Sepani, District Thaba N'Chu, O.F.S., on Nov. 18th, 1922, in bright sunlight, and a most exhaustive search extending over several years for the larva of this species resulted in it being finally run to earth at the end of March 1927. A few larvae were taken on a species of yellow bedstraw identified by the botanist of the Durban Botanical Gardens as *Galium garipense*, Lond. The larva when full grown measures about 1 inch in length, and is of a dark leaf-green. Between the dorsal and lateral lines it has a row of 9 crescent-shaped spots, yellow above and black below, a narrow lateral line of yellow, with a purplish top border converging on the base of the short horn, which is purplish at the base and black-tipped. Immediately below the lateral line are a series of black spots, single in the first two and last segments and double like an accent *aigu* in the case of the six central segments. The spiracles are black and are in the centre of an undulating purplish-brown line with a narrow pale yellow upper border and a broad white lower border. A loose grass cocoon is made before pupation, and the pupa, which has no special distinguishing marks or peculiarities, is of a uniform shiny black.

"Larvae in various stages of development taken towards the end of March had all pupated before the middle of April, and the first specimen emerged on Nov. 27th of the same year.

"There is another small moth—not a Sphingid—which imitates *M. pumilum* or is imitated by it when at rest. The larva of *M. pumilum* closely resembles the seed head of a species of grass which grows among the food-plant, and this, in addition to the fact that it falls to the ground as soon as the plant is touched, makes it very difficult to find."

DR. G. D. H. CARPENTER'S FURTHER OBSERVATIONS ON INSECTS IN UGANDA.—Prof. POULTON, in the absence of the author, communicated the following record of observations made in N. Uganda and the Buddu coast of the Victoria Nyanza, and exhibited the specimens referred to. Kind help was rendered in the specific determinations by the following friends—Mr. G. J. Arrow, Mr. F. Barnett, Mr. K. G. Blair, Mr. W. E. China, Dr. K. Jordan, Capt. N. D. Riley, and Mr. B. P. Uvarov.

1. *Charaxes lacteinctus*, Karsch, and its model *C. varanes vologeses*, Mab., taken together on Mt. Otze.—The following passage referred to the capture of these interesting associates, previously taken in the same locality by Dr. Carpenter in 1921 and seen in 1925 (*Proc. III. Internat. Entom. Kongr.*, Bd. II, p. 526, Weimar, 1926). Mt. Otze, in the W. Madi Province of N. Uganda, is about 10 m. W. of Dufile.

"15 May, 1927. *Gimara*, W. Madi, N. Uganda.—I fear I have done very little butterfly work as yet, partly because I have been much too busy, and we haven't moved about a great deal, staying for some time at each place to get hold of the Sleeping Sickness cases. However, I had a Sunday on Mt. Otze and went out with my net. This time I succeeded in catching *Charaxes lacteinctus* (with a model), but it was rather a worn male. I also got, I think, *Charaxes boueti*. Has that been taken in Uganda?"

The *varanes* and *lacteinctus*, both males, bore the date 1 May, 1927, with the note "many seen" on the latter. The *boueti* (30 April, 1927) was the race *C. b. rectans*, Roths. & Jord., not hitherto known from Uganda, although a freshly emerged specimen captured by Dr. Carpenter and two taken by Capt. A. L. Kent-Lemon, just outside the northern border, in S. Sudan, will be recorded in Dr. Carpenter's paper to appear in the 1928 *Trans. Ent. Soc. Lond.* The black markings of the upper surface in the Uganda specimen were less heavy, especially on the hind-wing, than in the Sudan and Abyssinian examples of *rectans*, and it was possible that further material would lead to the recognition of a distinct subspecies.

2. *Interesting butterflies from the Buddu coast of the Victoria Nyanza.*—The following paragraphs were extracted from a letter written by Dr. Carpenter, "on tour, Buddu coast," on 18 September, 1927. When necessary the names have been inserted in square brackets.

"I had such an interesting catch on 16 September that I hasten to write and send it to you—a lovely *Mimacraea* [*M. eltringhami*, H. H. Druce, ♂] which I am sure I have not seen before, and hope it may be a new one. It was in association with *Acraea alciope*, Hew., ♀ f. *aurivillii*, Staud., whose under surface it resembles in a wonderful degree. On the upperside the sepia-brown fore-wing has the common broad orange angulated band. The hind-wing is of a redder orange than this band, but the inner third of it, along the anal margin, is white. I suddenly saw it among bushes, and caught it without having had time to think about its appearance, but having just caught an *aurivillii* ♀ I was on the look out for more and certainly was struck by the resemblance, though I believe a thought flashed through my mind that it looked different, and as soon as I got it in the net I realised it was a *Mimacraea*. At the same locality (called Namirembe), and in the same place I took *Planema tellus cumelis*, Jord., *Acraea jodutta*, F., black and white female f. *jodutta*, and *Precis rauana*, Gr.-Sm. [1 ♂, 4 ♀], in more abundance than I have ever seen before. I had only about three-quarters of an hour to spend there and wanted much more!

"Yesterday, 17 September, in the same strip of coastal forest but about 6 miles south, at a place called Bale, I found *Papilio cynorta*, F., in abundance, and got three black and white females, and one in which the pale areas were buff instead of white, an interesting transition to *peculiaris*, Neave; also a nice Liptenine, *Larinopoda tera*, Hew. [an unusually lightly marked form], which, very like a common one, is I think slightly different and bore a great resemblance to *Nychitona medusa*, Cr.,—especially in the arrangement of marbling on the under surface of the hind-wing.

"I am hoping to-day, after the work is done this morning, to have time to investigate the forest at our present camp, still further south. I am doing an inspection of the landing-places, and examining fishermen, from Bukakata port southwards to the Tanganyika boundary. I wish I could have more time for collecting, for the coastal forest is practically continuous with the Tero forest round Kakindu, where I collected during 1915.

"It's a very different coast from any other I know—a great sandy beach all the way along, thrown into ridges by different lake levels, and backed by bush or forest forming a coastal strip, behind which lie several miles of flat country,



swampy in the rains, which can only very recently have emerged from under the lake. The lake is, I think, now, rather lower than it was when Fiske made a fly survey along here in 1914-15, and the fly is *very* much less abundant. I feel that this is probably due to recession of the lake from the belt of bush (there is something like 100 yards of open sand now), so that the fly cannot deposit its pupae in shade near water.

"There are great numbers of shells (?*Melania*) washed up on the sand, and I have found, also washed up, a lot of a huge water-bug, the biggest Hemipteron I have ever seen—I suppose a *Nepid*, but without the long air-tubes. I have in the back of my mind a name—*Belostoma*—but am without books at the moment. I don't understand why they are washed up, for the weather is *very* calm for this part of the lake, and if they are washed up now what must happen in rough weather? They look as if they ought to cling to weeds in pools, but there are no pools along here, only shallow sandy bottom, and they are feeble swimmers. Perhaps they fly at night, leaving the swamps which lie along the shore behind the big ridges of sand, and drop into the lake, when they are subsequently washed up."

3. *The mimetic Asilid fly, Hoplistomerus serripes, F. (Dasypogoninae), and its model, Liris haemorrhoidalis, F. (Sphegidae), taken together.*—The following passage referred to the specimens:—

"24 June, 1927: on tour Madi, N. Uganda.—Here at Ajumani, E. Madi (on June 23rd), my fly boy brought a nice Asilid with rather marbled wings, whose bright gold abdominal pubescence strongly suggests mimicry of a Fossor caught at the same time and place, which I send with it. I noted in my 'Taste' paper (at end, on 'Mimicry') an Asilid of this type, but think I suggested a Scoliid as model."

The resemblance to the Fossorial model was very close. Dr. Carpenter's earlier observations on this Asilid mimic were recorded on pp. 25, 72, and 100 of his paper in *Trans. Ent. Soc. Lond.*, 1921.

4. *The Coreid bug, Euthetus limbatus, Dist., mimicking a Fossorial wasp.*—

"29 May, 1927: Pakelli: E. Madi.—Yesterday I got a delightful Bug on the road to a rocky kopje, about a mile from Pakelli—a really good Fossor mimic. It ran very quickly, with little jerky flights occasionally, and quivering antennae. The sides of the body have white marks (as in Braconoid Longicorns), and the top of the abdomen seen in flight is bright red. I got two specimens which will reach you soon."

The confirmatory note accompanying the specimens stated that Dr. Carpenter considered them the best Fossor mimics except those of MUTILLIDAE. Mr. W. E. China informs me that the ant-like Hemipteron described by the late W. L. Distant as *Megapetus atratus* (PYRRHOCORIDAE) is a larval form of a species of *Euthetus* (COREIDAE). See *Trans. Ent. Soc. Lond.*, 1902, p. 535, 542, pl. xix, figs. 57, 58. These larvae were taken with ants and the ant-like Tettigoniid (Locustid) *Myrmecophana* ? *fallax*, itself now known to be a larval form, by Dr. G. A. K. Marshall, F.R.S., on a small bushy vetch at Salisbury, Mashonaland (*ibid.*, p. 535). Dr. Marshall here points out that the Hemiptera are far more ant-like in their earlier stages, "at which period the similarity is most striking both in shape and move-

ments." It is to be hoped that it may be possible to investigate the mimetic relationships of the larval stages of Dr. Carpenter's specimens and the mature stage of those observed by Dr. Marshall.

5. *The Nabid bug, Nabis (Prostemma) falkensteini, Stein, mimicking a Mutillid.*—The following note referred to a specimen labelled "Palorinya, W. Madi: 5 May, 1927":—

"15 May, 1927: Guimara, W. Madi.—I have, as usual, always kept a keen look out for Mutillids. One day, while very busy microscoping Sleeping Sickness cases, I saw running on the floor an apparent Mutillid, and asked my wife to box it for me. It wouldn't run in, so I quickly got up, picked it up with forceps and dropped it into the bottle. When I came to take out my captures for the day I couldn't find three Mutillids, only two, and during the day there were three caught, as I believed. However, I found that the third was the one I had picked up in the house, a Mutillid bug—I think a Reduviid. It is quite new to me and the best Mutillid bug mimic I have ever seen."

6. *The Longicorn beetle, Dirphya argenteovittata, Auriv. (Lamiidae), captured as a Braconid.*—The specimen, taken by Dr. Carpenter near Kampala, 18 March, 1927, bears the following label—"caught on wing in hand as Braconid, in some trepidation on account of fear of sting!"

7. *A Hispid beetle mimicking a Lycid.*—The Hispid, of the genus *Cryptonychus* and species unnamed in the British Museum Collection, was taken on the Buddu coast of the Victoria Nyanza, 15 September, 1927. It bears the label "Very Lycoid on wing."

8. *Mimetic association between Carabid and Erotylid beetles found together under bark.*—The specimens, taken 30 May, 1927, at Pakelli, E. Madi, included one Carabid, *Thyreopterus flavosignatus*, Dej., and three Erotylids, *Megalodacne interrupta*, Lac. Dr. Carpenter had taken the same Carabid under bark with several much larger Erotylids (*Mimodacne flavosignatus*, Fairm.), at Ndala, Tang. Terr., in 1917 (*Proc. Ent. Soc. Lond.*, 1917 (1918), p. 89). Dr. G. A. K. Marshall, F.R.S., also found *Thyreopterus flavosignatus* under bark with an Endomychid beetle bearing a similar pattern, at Salisbury, Mashonaland. See *Trans. Ent. Soc. Lond.*, 1902, p. 522, where Dr. Marshall also speaks of the "extremely pungent smell" of a large Erotylid, *Encaustes*, now known to be the Fabrician species *Megalodacne grandis*. The distasteful qualities of the Bornean ENDOMYCHIDAE and the fact that they supply the model for a Longicorn are recorded by Shelford (*P.Z.S.*, 1902, p. 247). There can be little doubt that certain African species belonging to these three specially protected families CARABIDAE, ENDOMYCHIDAE and EROTYLIDAE, and possessing similar habits, form associations with Synaposematic or Common Warning Colours. An interesting account of these beetles and their associations is given by Mr. G. J. Arrow in his volume on the two last-named groups and the LANGURIIDAE in the "Fauna of British India" series, 1925, p. 14.



9. *Alloprocryptic resemblance of a larval Reduviid*.—The following note referred to two larvae of the genus *Acanthaspis*, taken 7 July, 1927, in the Guru-Guru Hills, N. Uganda :—

"I also got on *tops* of grass-stems (where they had climbed to get out of the way of *Dorylus*) two larval Hemiptera nicely alloprocryptic. Each had a bit of leaf fastened to its back. I saw the smaller one first and gazed at it for some time without knowing what it was."

10. *The males of Sphex umbrosus, Chr., clustered and buzzing loudly on the tip of a branch at sunset*.—

"24 June, 1927. On tour, Madi, N. Uganda.—On a large tree, not a thorn, on 2 June, at Zaipi, E. Madi district, I saw a curious thing late in the evening. There was a very loud buzzing, and I found, congregated, indeed packed closely together like a swarm of bees, a large number of a black Sphegid clustering at the end of a leafy branch; at least 50 were present I estimated, and others kept flying to join them. As I saw them on the same spot on two other evenings it seemed as if they were seeking a regular roosting-place. I caught 4, and they will come with the other specimens." Dr. Carpenter also wrote 29 August, 1927, from Entebbe—"As regards the clustered Sphegids, if size is any criterion, the sexes were probably mixed. I think I sent you both large and small specimens."

Of the specimens, which bore a label confirming the above record, two were large and two small. Mr. Hamm found that all were males, as he had anticipated from the description of their habits. He also observed that one of the small males was stylipised. It was probable that the sound assisted the scattered males to find and join the cluster.

11. *A note on the enemies of ants*.—The following observations were of interest in relation to Dr. J. Bequaert's paper in *Bull. Am. Mus. Nat. Hist.*, vol. xlv, pp. 271-331, New York, 1922, and the comments in *Proc. Ent. Soc. Lond.*, 1924, p. xlviii.

"15 May, 1927 : Guimara, W. Madi.—Ant mimicry is very interesting because it is so obviously quite useless against lizards, particularly Agamids, which often sit by an ant-run for quite a long time, picking up the ants one after another. My wife saw one day a small Lacertid, longitudinally striped, with blue tail, eating ants vigorously one afternoon, while she was lying down. On the other hand, one day at tea we were vigorously 'swotting' flies and the corpses were being carried away by ants. We watched a black and white Wagtail (I think *M. capensis*), to see whether it would pick up any of the ants. It wandered about, seizing the freshly killed flies, but when one of these had an ant already on it, the Wagtail shook it vigorously until it got rid of the ant which it obviously didn't like."

12. *Asilid flies and their prey*.—The following specimens were taken by Dr. Carpenter :—DASYPOGONINAE : *Neolaparus*, sp. not in British Museum, with a small wasp *Odynerus* sp., 2 June, 1927, Zaipi, E. Madi. LAPHRINAE : (1) *Laxenecera albicincta*, Lw., ♂, with the smaller Asilid fly *Ommatius* sp. (ASILINAE), 17 July, 1927, Kachung, Lake Kwana; (2) *L. albicincta*, ♀, with the bug *Coranus reuteri*, SCHOUT. (REDUVIIDAE), at the same date and locality as (1).

A MALE OF THE DANAINA BUTTERFLY *AMAUROS HECATE*, BUTL., WITH THE HIND-WING SCENT-BRANDS PERFORATED BY ANTS.—Referring to the note in *Proc. Ent. Soc. Lond.*, vol. ii, 1927, p. 58, Prof. POULTON exhibited the specimen of *Amauris hecate*, taken near Yambio in the Bahr-el-Ghazal at the end of August, 1927, and communicated the following passage from a letter by Dr. E. E. Evans Pritchard :—

“ 20 December, 1927.—I think it is safe to assume that the red ants ate through the scent organs of the butterfly which you mention. The zinc boxes in which I pinned the flies were, upon opening them, full of red ants, though how they can have entered I cannot say with any certainty.”

FURTHER OBSERVATIONS ON THE FERTILISATION OF *OPHRYS FUSCA*, LINK.—Prof. POULTON drew attention to a paper published by Colonel M. J. Godfery, F.L.S., in the *Journal of Botany*, for December 1927, p. 350, and containing the record of further observations at Hyères, confirming and extending those made by M. Pouyanne and the author, of which a brief account was given in *Proc. Ent. Soc. Lond.*, vol. ii, pp. 31–33, 1927. Although constantly looked for, no visits of *Andrena* to *O. fusca* were witnessed at Hyères in 1925 and 1926, but in April 1927 bees were seen by Colonel and Mrs. Godfery and by Mr. M. Gordon to seek the flowers of this Orchid and withdraw pollinia on the end of the abdomen. Mrs. Godfery, on 4 April, “saw a small bee with two pairs of pollinia on the end of his abdomen visit two flowers of *O. fusca*, and withdraw a further pair from each. He then had eight pollinia in all, and was so weighted that he appeared to be down at the stern, as she expressed it. In each case he alighted on the lip of the flower, facing inwards, but immediately turned round and plunged the end of his abdomen into the cavity at the base of the lip, working it about vigorously.” Colonel Godfery also, on 6 April, saw a bee “bearing a small bunch of pollinia enter a flower of *O. fusca*.” The account continues—“I gently enclosed him in a glass-bottomed pill-box, and he was very active, seeking some way of escape. The bunch of pollinia appeared to hamper his movements, and he tried hard to drag them off with his hind legs, but without success. I then cut off two fresh flowers of *O. fusca*, and put them into the box with him. Almost immediately he went to one of them, turned round, so as to face outwards, and thrust the end of his abdomen into the basal cavity of the lip, so that the bunch of pollinia disappeared from sight. He engaged in very active movements, thrusting his abdomen about, and changing the position of his feet on the lip, as if to get a firmer hold. I watched him through a low-power lens, and he appeared to be in a state of wild excitement. This went on for quite an appreciable time, after which he came off the flower with an additional pair of pollinia.” After resting and vainly trying to remove the pollinia he came across the second flower and acted in the same manner, “finally emerging with yet another pair of pollinia. The vigour with which he used the bunch of bright yellow pollinia, as if he were trying to sweep out the basal cavity of the lip with a tiny broom, was surprising. It could not fail to place a great deal of pollen on the stigma, which is just behind the cavity—indeed, the pollinia became so messed up and broken that it would have been difficult to count their numbers. . . . It came as a surprise that an insect already bearing two pairs of pollinia should visit three flowers in quick succession.” The observation appeared to sup-



port the suggestion made by M. Houzeau de Lehaie (*Bull. des Naturalistes de Mons et du Borinage*, t. vii, 4, 1925, pp. 81, 82), that the stimulation of the males may play an important part in the life of these bees.

Colonel Godfery, who had kindly sent a copy of his paper for the Society's library, had also presented to the Hope Collection the two interesting male bees exhibited to the meeting:—(1) *Colletes cunicularia*, L., bearing three pollinia on its head, taken 14 March, 1921, while visiting *Ophrys arachnitiformis* at Les Salins, a few kilometres from Hyères; (2) *Andrena trimmerana*, K., bearing a bunch of about seven pollinia on the end of its abdomen, taken 1 April, 1924, or possibly 6 April, 1927, while visiting *O. fusca* at Hyères.

LIVING LARVAE OF *ALLOCORMODES KOLBEI*, V. DER WEELE (ASCALAPHIDAE), FROM NAIROBI.—Prof. POULTON exhibited two living larvae out of three which had been posted by Dr. V. G. L. van Someren, on 17 December, 1927, at Nairobi, and were delivered at Oxford on 24 January, 1928. A fourth larva had spun a spherical cocoon in the box which also contained two dead larvae, one very small, and two cast skins. It was possible that the dead larvae had been sucked dry by others. Except for this possible food the living larvae had eaten nothing for about five and a half weeks. They arrived in a healthy condition and had been fed upon flies. These larvae were of the same species as those on which Dr. van Someren had recorded interesting observations in *Proc. Ent. Soc. Lond.*, 1923, pp. lxi, lxii; 1924, pp. lix–lxv. It was, at the time, impossible to determine the species with certainty, the two bred specimens being deformed, but *Allocormodes* was considered to be the probable genus (*ibid.*, 1924, p. lxv, note). Later on, however, Dr. van Someren succeeded in breeding excellent imagines of which two, bearing respectively the dates April and May 1925, were kindly presented to the Hope Collection. One of these was exhibited to the meeting, having been kindly determined, after comparing it with the British Museum collection, as *Allocormodes kolbei*, by Mr. D. E. Kimmins. Of the three living larvae one, much the largest, bore a wonderfully perfect likeness to grey-lichen-covered bark, the two smaller an equally beautiful likeness to a brownish-orange lichen. Two pieces of bark, bearing, respectively, lichen of these colours, were enclosed in the box, and it was hoped to test the colour-susceptibility of the larvae by providing the orange larvae with grey lichen and the grey larva with orange. The latter larva was, however, so large that any further response was improbable. Mr. Hugh Main had kindly consented to keep and study the large and one small larva, and it was hoped that his notes and photographs, together with the observations recorded by Dr. van Someren, would throw much further light on the life-history of this most interesting Ascalaphid.

A GREEN FEMALE OF *MIMETICA TUBERATA*, VIGNON (TETTIGONIIDAE), FROM COSTA RICA.—Prof. POULTON exhibited a green female *Mimetica* kindly sent to him from Las Concavas, Cartago, by Mr. C. H. Lankester. The specimen bore the label—"Found as usual while pulling out dead leaves among our Orchid bulbs—*Epidendron paleaceum*: Oct. 9, 1927." The accompanying letter stated that this was the first green female that Mr. Lankester had found. Other examples of the same or closely allied species collected by Mr. Lankester had been exhibited or described at meetings of the Society (*Proceedings*, 1923, lxxxiii–lxxxvi; 1924,

lxv–lxviii; 1926, pp. 9, 10). The green female now shown for the first time resembled, in the comparatively smooth contour of its leaf-like elytra, the green male represented by the left-hand figure on p. lxxxv (*ibid.*, 1923) more nearly than the brown male of the upper figure. If therefore these forms were distinct species, it was probable that the green male and female were *M. tuberosa*, Vignon (*ibid.*, 1924, lxvi–lxviii), while the brown male of the upper figure and the only brown female hitherto sent by Mr. Lankester (*ibid.*, 1926, p. 9) were *M. picteti*. Both these pairs were exhibited to the meeting.

BLUE SPECIES OF *AGRIAS* FROM COLOMBIA.—Mr. A. DICKSEE exhibited seven specimens of *Agrias*, the following species, or intermediates between them, being represented:—*A. stuarti*, Godm., *A. beatifica*, Hew., *A. beata*, Stgr., *A. pherenice*, Fruhs. These were all taken in October last at the same place in Southern Colombia, close to the frontier of Ecuador. He commented on the fact that as *A. pherenice* was not properly described by Fruhstorfer (it is only mentioned in Seitz); he merely mentioned that the red or yellow mark on the underside of the hind-wing was less than in *A. beatifica*, but gave no description whatever of the upperside; so that it is difficult to say, absolutely, what specimen comes definitely under this name.

Mr. T. A. BARNES gave an account, illustrated with lantern slides, of the Insect Fauna of the islands of San Thomé, Príncipe and Fernando Po in the Gulf of Guinea.

### Wednesday, March 7th, 1928.

Mr. J. E. COLLIN, President, in the Chair.

#### Obituary.

The PRESIDENT announced the deaths of the following Fellows:—G. F. MATHEW, E. B. NEVINSON, J. A. NIX, R. E. MCCONNELL, W. G. DAWSON.

#### Election of Fellows.

The following were elected Fellows of the Society:—Major G. COVELL, I.M.S., M.D., Central Malaria Bureau, Kasauli, India; C. O. HAMMOND, 56, Boreham Road, Lordship Lane, Wood Green, N.; MAHMOUD HOSNY, Entomological Section, Ministry of Agriculture, Cairo, Egypt; Major J. A. SINTON, V.C., O.B.E., I.M.S., M.D., D.Sc., Director, Malaria Survey of India, Kasauli, India; WILLIAM STEER, Downing College, Cambridge.

#### Exhibits.

RARE MITES AND BEETLES FROM WINDSOR FOREST.—Mr. DONISTHORPE exhibited living individuals of the mite, *Antennophorus uhlmanni*, Hall., on workers of *Acanthomyops* (*Chthonolasius*) *umbratus*, Nyl. He said:—

“The ants exhibited are from a very strong colony of *Acanthomyops* (*Chthonolasius*) *umbratus*, Nyl., which I took on October 26th, 1927. The nest was situated



in the stool of a felled poplar in Windsor Forest. It will be observed that most of these workers have individuals of *Antennophorus uhlmanni*, Hall., which were very abundant in this nest, attached to them. There is also another species of mite, *Uropolyaspis hamuliferus*, Mich., present fastened to the femora of a few of the ants. As the ants are now dying off, I thought it best to exhibit them whilst a number of the mites are still present *in situ*. Probably most of you have read of the interesting habits of these Acari in my book on the *Guests of British Ants*; but many of you may not have seen the mites themselves in life.

"When I had the pleasure of exhibiting *Ludius ferrugineus*, L., to this society last October, I pointed out that I had made a list of the rarer species of Coleoptera taken in Windsor Forest, years ago, by Stephens and others. I mentioned a number of these which I had retaken in the last few years in that locality. I am now able to add yet another species—*Ischnodes sanguinicollis*, Pz.—of which I captured sixteen specimens, on February 15th last. They occurred in the black wood mould of a felled ash, accompanied by their larvae, and the tree in question also contained *Dorcus parallelopidus*, L., and its larvae, as well as the larvae of *Ludius ferrugineus*, L.

"The *Ischnodes* has not been taken at Windsor since it was recorded by Stephens in 1830.

"It will, perhaps, be remembered that Dr. Imms described [*Ent. Mo. Mag.*, 63, 161 (1927)] last year the capture of six specimens of this beetle, with its larvae, in the half rotten wood from the interior of an old ash tree which had been blown down at Harpenden. He mentioned that *Dorcus* and its larvae occurred in abundance, and that *Melanotus rufipes* and 'its large striking larvae were also present.' I have little doubt that the latter were really the larvae of *Ludius ferrugineus*, L."

*HYPONOMEUTA PADELLUS*, L., *H. MALINELLUS*, ZELL., AND *H. COGNATELLUS*, HB.—MR. ROBERT ADKIN said that considerable doubt appeared to exist in the minds of the few British entomologists who had paid any attention to the species of *Hyponomeuta* as to whether the insect described by Zeller (*Isis*, 1838, p. 670; 1844, p. 220) under the name of *malinellus* occurred in this country, and further whether it was specifically distinct from *padellus* of Linnaeus.

During the past three years he had collected any *Hyponomeuta* larvae that he was able to obtain, had reared them, and now exhibited the long series of imagines that they had produced.

From both wild crab-apple growing in the woods and from cultivated apple trees growing in his garden at Eastbourne practically white moths were obtained; only a small proportion of them showing a slight greyish tinge. He had compared these with the series of *malinellus* in the Zeller collection in the British Museum, with which they agreed exactly.

From larvae found on whitethorn near Cambridge and kindly sent to him by Mr. W. H. Thorpe; from others found also on whitethorn in the woods near Eastbourne, adjacent to the crab-apple trees; from larvae on blackthorn from Mersea in Essex and from Oxford, nothing but lead-coloured moths were reared; but from a brood found also on blackthorn growing on the chalk Downs near Eastbourne a small proportion of the moths were practically white, although the majority of them were

as dark as those from the other blackthorn broods. He had no hesitation in referring all these whitethorn and blackthorn insects to *padellus*, L.

While these various broods were feeding up, opportunity was taken to note any differences that there might be. All the larvae were grey with black markings, but those of *malinellus* were by comparison somewhat lighter and yellower than the others. In habits they differed very considerably. *Padellus*, whether on hawthorn or blackthorn, spun a mass of web over several twigs, and, as the food supply was consumed, increased it to take in further twigs, and when full-fed the larvae spun flimsy, dark grey cocoons, in no particular order, but just placed in little clusters at all sorts of angles to each other anywhere within the web. *Malinellus* was much neater in its habits. When young the larvae spun a web about a single leaf, the lower cuticle of which they devoured; then the web was continued up the twig until another leaf or pair of leaves were encountered and similarly treated. If there were not enough leaves on a twig to satisfy the brood, the larvae removed to another and recommenced operations. When full-fed they spun dense, white cocoons, placed side by side in an orderly manner and practically always attached to one of the leaves in the web.

Zeller noted these differences in habits; he was also at some pains to differentiate between his *malinellus* and *cognatellus*, Hb., a *euonymus*-feeding species, for as he says, both are white but *malinellus* is smaller and the tone of the "white" is somewhat different. In the method of pupation, however, *malinellus* approached *cognatellus* much more closely than it did *padellus*.

Mr. A. L. Rayward had very kindly made a considerable number of microscopic preparations of the genitalia of all three species. From these and from other species that have been similarly examined, it appears that the genitalia of *Hyponomeuta* spp. are peculiar in that the saccus is unusually prolonged, and that this organ shows specific differences. In *cognatellus* it is stout and bulbous towards the tip; in *malinellus* by comparison slender and almost straight, and in both appears to be practically constant. In *padellus* normally it is tapered from narrow at the base to broad at the tip, but it is by no means constant; occasionally a specimen being found in which it is quite as bulbous as in *cognatellus*, or at the other extreme, almost as straight as it is in *malinellus*.

Undoubtedly all three insects are very closely related, but from what has already been stated, he thought that Zeller was probably right in giving *malinellus* specific rank. Further, there appears to be little doubt that it is usually *malinellus* that attacks our cultivated apple trees.

A LIVING EXAMPLE OF *RHYSSA PERSUASORIA*.—Dr. J. G. MYERS exhibited and made remarks on a living individual of *Rhyssa persuasoria* bred at the laboratory of the Imperial Bureau of Entomology at Farnham Royal in connection with his investigations on the parasites of *Sirex*.

THE PUPA OF *PSEUDOPONTIA PARADOXA*, FELD.—Mr. G. TALBOT said: "I have been asked by Dr. Schouteden, Director of the Musée du Congo Belge at Tervueren, to place on record some account of the pupae of *Pseudopontia* collected by him in the Congo forest. He has kindly supplied two photographs showing the pupae from two angles of view (Plate I). There are 6 specimens placed one behind the other





*Vaus & Crampton, Ltd.*

PUPAE OF *PSEUDOPONTIA PARADOXA*, Feld.





along the midrib of a leaf, and all have undergone emergence. Dr. Schouteden came upon them as the last emergences were taking place, and he took specimens of the imago.

"The abdominal segments are covered in short hair, and the head process is blunt and triangular. The position of the pupae is understood to have been head upwards.

"The Pierine character of this pupa supports the conclusions reached by Dr. F. A. Dixey, and published in the Society's *Proceedings*, 1922, p. lxi, etc., on this genus."

*STICHOPHTHALMA SPARTA*, DE N., AND ITS RACES.—Maj.-Gen. Sir H. TYTLER said: "Lord Rothschild received a specimen of a *Stichophthalma* from the late Colonel Bingham, which was taken at Kindat on the Upper Chindwin River, L. Burma, and recorded it as the undescribed male of *Stichophthalma sparta*, de N., in *Zoologicae Novitates*, vol. xxiii, p. 307, Pl. IV, f. 6.

"As a matter of fact de Nicéville's type is a male and not a female. In the *J.B.N.Hist. Soc.*, vol. xxiii of 1914, p. 227, I recorded the capture of several males and females of a similar *Stichophthalma* from Manipur and the Abor Hills which I considered to be *S. sparta*, de N., in spite of the fact that there were several differences from the type, which I had an opportunity of examining, and which I pointed out.

"On showing my series to Lord Rothschild, he was of the opinion that his Kindat specimens and my Manipur forms were not typical *S. sparta*, de N., and described a male of this form in the *Zoologicae Novitates*, vol. xxv, p. 310, under the name of *Stichophthalma tytleri*. Since then this form has been taken in the Naga Hills, from whence I have a male, and from Upper Burma in hills between Kindat on the Chindwin and Katha on the Irrawadi, whence I have seen several specimens. The types were described from Sebong specimens.

"The late Mr. Archbald took a male and female of a *Stichophthalma* at Gokteik, N. Shan States, which is close to the form *tytleri*, Rothschild, and intermediate between this form and *S. louisa*, and differs from the former in having the apical area of upper fore-wing more extended and of purer white and the marginal area of upper hind-wing much paler than the rest of the wing and almost white in places. From *S. louisa* it differs on the upperside in having the yellow area much darker and redder, darker even than *S. tytleri*, and in having the terminal area fore-wing not pure white; the marginal area upper hind-wing is also not pure white, and the terminal hastate marks are larger, approaching typical *sparta*. Colonel Evans in his 'List of Indian Butterflies' alludes to this form under the name of *S. fruhstorferi*, Röber, but it is quite a different insect, and I propose to call this form ***S. sparta archbaldi***, subsp. n., after the late Mr. Archbald, who first obtained it. The types are in the British Museum.

"In the extreme N.E. of Burma two closely connected forms occur: one from Sadon in the hills due east of Myitkyina and the other further north at Htawgaw; both these places are close to the Chinese frontier.

"The form from Htawgaw is undoubtedly typical *S. sparta*, de N., of which the type now in the Calcutta Museum is the only recorded specimen and only differs from the type figure in having the apical area of the fore-wing rather paler, but the figure in this respect is inaccurate, for in my note in the *J.B.N.Hist. Soc.*, vol. xxiii,

before alluded to, I stated that I had had an opportunity of seeing the type and comparing it with the figure, and made the following note: 'The original figure in the *J.A. Soc. Beng.*, vol. xliii, is very good except that on the upperside the apical area of the fore-wing is not pale enough.' The rediscovery of de Nicéville's insect is very interesting, but it is still doubtful if the type came from Manipur at all; de Nicéville's obtained his type from a telegraph signaller in Manipur who used to sell butterflies, and he may have got it possibly from Htawgaw himself, where he might have been stationed at some time. Six males were obtained at Htawgaw in July.

"Further south at Sadon a form of *Stichophthalma*, although very close to the above, is not quite typical and is worth separating. It differs from *S. sparta* in the apical area fore-wing above being paler and on the underside the markings being all darker and not so uniform; in this form the submarginal line on underside of both wings is closer to the outer margin than it is in typical *sparta*, de N. I propose calling this form ***S. sparta evansi***, subsp. n.

"A good series of males and seven females was obtained at Sadon at about 5000 ft. in July. The types are in my collection and paratypes have been deposited in the British Museum.

"*S. sparta* has hitherto been considered as a race of *S. howqua*, and *S. tyleri* as a race of *S. louisa*, but the four forms mentioned above appear to be races of one another, and it is quite possible they may be connecting links between *S. howqua* and *S. louisa* which would make these two forms conspecific; but for the present I think it better to keep them apart from both and consider *S. sparta* to be a distinct species.

"The following will then be the geographical distribution of this group:—

<i>S. sparta sparta</i> , de N.	Type ? Manipur. Htawgaw, N.E. Burma.
<i>S. sparta evansi</i> , subsp. n.	Type Sadon, N.E. Burma.
<i>S. sparta tyleri</i> , Rothsch.	Type Manipur; Abor Hills, Naga Hills; hills between the Upper Chindwin and the Irrawadi Rivers, between Kindat and Katha.
<i>S. sparta archbaldi</i> , subsp. n.	Type Gokteik Gorge, N. Shan States."

THE PROPORTIONS OF THE FORMS OF *PAPILIO DARDANUS CENEA*, STOLL, BRED IN 1927 FROM WILD LARVAE IN THE DURBAN DISTRICT BY G. F. LEIGH.—Prof. POULTON communicated the following extract from a letter written to him by Mr. G. F. Leigh:—

"4 October, 1927.—I am sending you the results of my breeding of *P. dardanus* during the past year. I obtained in all 279 wild larvae, of which 8 only were ichneumonised. The remaining 271 produced the following forms:—

" <i>Leighi</i> , Poulton . . . . .	3
<i>Trophonius</i> , Westw. (1 crippled) . . . . .	6
<i>Hippocoonoides</i> , Haase . . . . .	14
<i>Cenea</i> , Stoll . . . . .	129
Males . . . . .	119
<hr/>	
271."	



Considering the great rarity of the *leighi* ♀-f. in Natal, 2 per cent. of the female forms was a high proportion. The immense predominance of the *cenea* female was to be expected in this part of the range of the species, where *Amauris echeria*, Stoll, and *albimaculata*, Butl., were so common as compared with *A. niavius dominicanus*, Trim., the model of *hippococonoides*, and where *D. chrysippus*, L., was, as usual, more partial to open country than its *trophonius* mimic.

A FURTHER NOTE BY CAPT. C. R. S. PITMAN ON PIERINE MIGRATION IN KENYA COLONY.—Prof. POULTON said that Capt. Pitman had recently sent the following record which he had found since his return to Uganda. The locality was E. Cherangani (0° 56.5' N.; 35° 16' E.), Trans-Nzoia, 6200–6400 ft., approximately 40 miles E. of Mt. Elgon.

“27.iv.1922.—White and yellow butterflies of Brimstone variety (♂ and ♀ *Catopsilia florella*, F.) which have been flying north for some weeks are now all flying south. These movements take place chiefly before noon. There has also been a big movement north of swarms of a white and black butterfly (*Belenois mesentina*, Cram.), for some weeks.”

Capt. Pitman's note on the 1926 migration of the latter species in the same district is recorded in *Proc. Ent. Soc. Lond.*, vol. ii, 1927, p. 43.

CAPT. PITMAN'S OBSERVATIONS ON WAGTAILS ATTACKING BUTTERFLIES IN KENYA COLONY.—Prof. POULTON said that Capt. Pitman had informed him of the following attacks which were also being communicated to the Bombay Natural History Society. In the locality, E. of Mt. Elgon, mentioned in the previous note, he had daily watched a pair of *Motacilla aguimp*—the African Pied Wagtail—eating numbers of butterflies, but neglecting the PIERINAE. He had also observed a pair of *Motacilla cinerea* catching butterflies drinking at a damp spot near a stream in the same locality.

Mr. C. F. M. Swynnerton and Dr. G. D. H. Carpenter had also recorded the relative distastefulness of the genus *Belenois* which usually contributes the largest proportion to the assemblages of Pierines drinking at moist places. Thus in 1915 Dr. Carpenter watched a pair of Wagtails (probably *M. vidua*) at Kakindu, in Tanganyika Territory, eating 29 varied butterflies in  $\frac{1}{4}$  hr., but always neglecting the “Whites” (in the literal sense) in spite of their great abundance. On the following day, however, a single “White” was eaten (*Proc. Ent. Soc. Lond.*, 1915, pp. lxix, lxx), and in 1917, at Itigi, Tang. Terr., Dr. Carpenter observed that a shrike (probably *Campophaga nigra*) ate *Belenois* as well as all other Pierines which came to a flowering bush (*ibid.*, 1917, pp. lxii, lxiii).

OBSERVATIONS AND EXPERIMENTS ON DISTASTEFUL INSECTS IN TENERIFE.—Prof. POULTON called attention to Mr. G. H. Gurney's observation of *D. chrysippus* being eaten by a lizard, and his statement that he had “several times noticed examples caught in the gigantic spiders' webs, which often stretch from bush to bush, and eaten by the enormous grey spiders . . .” The var. *alcippus* he had found to be very scarce and only took two specimens. (*Entomologist*, Feb., 1928, p. 35. Compare *Proc. Ent. Soc. Lond.*, 1927, p. 59.)

Prof. Poulton also said that in 1888, he had observed the abundance and conspicuousness of the gregarious larvae which hatched from the egg-clusters of *Celerio euphorbiae tithymali*, Boisd., in Tenerife, and had conducted a few experiments.

2 small larvae were offered to a common lizard from Grand Canary.

1 small larva was offered to a common Gecko from Grand Canary.

2 small larvae were offered to a common Gecko from Tenerife or Grand Canary.

6 larvae of moderate size were offered to 7 Geckos from Grand Canary and another common lizard from Tenerife or Grand Canary.

The larvae were placed in the cages with these lizards on April 7 and removed on the following day, not one having been eaten.

ADAPTATIONS WHICH DISCOURAGE IN-BREEDING IN LEPIDOPTERA AND OTHER INSECTS.—Prof. POULTON said that he was indebted to the kindness of friends for some additional notes on this subject.

1. *Families of one sex in the Pierine butterfly Mylothris*.—Miss M. E. Fountaine had written from Guadaloupe on 2 February, 1928, informing him that the all-female family of *Mylothris spica*, Möschl. (*Proc. Ent. Soc. Lond.*, 1927, p. 75), was reared from a batch of ova (not larvae) found on a leaf. Miss Fountaine's experience supports the conclusion that the males of *Mylothris rubricosta*, Mab., which Mr. W. A. Lamborn found crowding the web of a communal spider (*Stegodyphus*) at Fort Johnston, Nyasaland, were part of an all-male family (*ibid.*, 1923, pp. xcii-xciv).

2. *Males of Hypolimnas bolina, L., still abundant in Viti Levu, Fiji*.—Mr. H. W. Simmonds had written on 31 January, 1928—" *Bolina* is quite numerous at present and males much in evidence." Hence the period of female preponderance which was so marked in this island up to 1925, and was apparently still maintained in Samoa, had been at an end for over two years (*ibid.*, vol. i, 1926, p. 29).

3. *Prof. J. W. Heslop Harrison's experience with insects producing a partial or complete preponderance of one sex in certain families*.—Prof. Harrison had kindly written 5 January, 1928—" Of all-♂ families of course I can refer you to my hybrid batches, but of pure species I have twice had all-female batches of *Bapta bimaculata*, F. (*taminata*), and in 1912 the same was true of *Cosymbia orbicularia*, Hb.

" You will also know, I expect, that the various *Nyssiae* (*Poecilopris*), including all the non-British forms (*pomonaria*, Hb., *rachelae*, Hulst., *graecarius*, Stg., *alpina*, Sulz.), tend to give a heavy preponderance of females.

" In other groups of insects I have had many all-female families—TENTHREDINOIDEA, CHALCIDIDAE, ALEURODIDAE, etc., but these are all cases of facultative or obligatory parthenogenesis."

4. *Partial or complete predominance of one sex in families of Lice*.—Dr. P. A. Buxton had kindly called his attention to the interesting results described by E. Hindle, Ph.D., in "Notes on the Biology of *Pediculus humanus*" (*Parasitology*, vol. 9, p. 259, 1916-17). The families obtained by the author fell into four sections:—

" (a) Entirely male. (b) Entirely female. (c) Male and female with the



number of males predominating. (d) Male and female with the number of females predominating" (p. 260).

The author states in his conclusion that "the interruption caused by the war has prevented these experiments being completed and the results obtained are insufficient to afford a reasonable explanation of the peculiar mode of sex inheritance in *Pediculus humanus* which has come to light. It is difficult to explain the results of the experiments in the case of the third generation where apparently the same crosses ( $\sigma\sigma \times \text{♀♀}$ ) have produced pure  $\sigma$  broods in two cases and a pure  $\text{♀}$  brood in one case" (p. 265).

In spite of the incompleteness pointed out by the author his results fall into line with those already obtained in gregarious insects, and like these, are probably adapted to hinder or prevent in-breeding. A valuable paper on the "Bionomics of *Pediculus humanus*, etc.," by the late A. Bacot (*ibid.*, p. 228) contains evidence that *P. humanus* and to a less extent *P. capitis* are gregarious. Thus, "*P. humanus*  $\text{♀♀}$  in most cases exhibited what may be roughly called a homing instinct; that is to say they returned again and again to the same spot to lay their eggs." The attempts to get the eggs spread instead of clustered were "as a rule . . . unsuccessful, there seemed to be some attraction which led to the deposit of fresh eggs where others were already laid" (pp. 232, 233). There was also in both species, but especially in *P. humanus*, "a tendency to gregariousness shown by clustering, especially on the part of the larvae and nymphs when about to moult" (p. 233).

The advantage of gregariousness is probably to be inferred from the following statement:—"With insects having such a generally restricted range of operations there is a very fair chance of their feeding a second time on the same area and benefiting by the inflammation resulting from their previous attacks" (p. 235). In the same manner reciprocal benefits would follow from the efforts of each insect in a cluster, for each would contribute to and receive advantage from the inflammation. In such sluggish insects, however, gregariousness would tend strongly to in-breeding, a danger increased by the mating habits of both species. Thus Bacot records that 18 out of 21 females of *P. humanus* were fertilised in succession by a single male, also 10 females of *P. capitis* by a single male (p. 256). It is reasonable to conclude that the unisexual families and the families with disproportionate sexes, recorded by Dr. Hindle, are the means by which this danger to the species is averted.

5. *In-breeding prevented by the sexes emerging at different times.*—Mr. O. W. Richards has kindly called my attention to the following paper by E. Lindner in *Zeitschr. f. wiss. Insektenbiol.* 9, 1913, p. 379–80—"Proterogynie beim Prozessionsspinner (*Cnethocampa pityocampa*, Schiff.)?" Mr. Richards points out that in this paper the author states that of the caterpillars from one nest, the  $\text{♀♀}$  (at least in captivity) emerge in July of one year and all the  $\sigma\sigma$  in July of the following year. He also states that in *Saturnia pavonia*, L., and *spini*, Schiff., the  $\text{♀♀}$  (in captivity) stay over an extra winter much more rarely than the  $\sigma\sigma$ .

6. *Unwillingness of "assembling" moths to pair when bred and kept in ordinary cages.*—In the previously mentioned letter of 5 January, 1928, Prof. Heslop Harrison gave a brief record of his experience on this subject:—

"I have had no trouble in pairing any of my Geometrids, etc., in an ordinary cage, but have found it very difficult indeed to secure that operation with *S. carpini*, Schiff. (*pavonia*, L.), *S. pyri*, Schiff., *S. spini*, Schiff., *T. polyphemus*, Cr., and *A. yamamai*, Guér., all of which assemble freely. Similarly, once, with *Orgyia antiqua*, L., from British Columbia, the same happened, and likewise with *P. plantaginis*, Hb., from Germany."

NOTES ON *NEMORIA VIRIDATA*, L., BY DR. R. C. L. PERKINS: THE DISTANCE AT WHICH THE MALE IS ATTRACTED BY THE FEMALE.—Prof. POULTON said that the following interesting observations were extracted from a letter written by his friend Dr. Perkins, F.R.S. He hoped that many other records of the kind would become available as the result of observations on "assembling" species as well as others.

"3 January, 1928.—It would be interesting to experiment on some of the Geometers the males of which are attracted from a great distance by the female although the antennae are less developed than in Bombyces. I have observed on more than one occasion the attraction of the male by the female of *Nemoria viridata*, a local species on the heaths near here. On one occasion I saw a very fine male on a common flying in a definite direction against, but not quite directly against, a strong steady wind. Its flight was unlike the usual one and I ran after it for fully 150 and probably 200 yards, but did not quite overtake it in the distance. It finally dived abruptly into a tuft of heather when I was from 10 to 20 yards behind. When I reached the spot it was already firmly *in cop.* with a freshly hatched female. I have seen similar cases since, but the attraction when noticed was from a shorter distance.

"*Viridata* is a curious insect. One year I had a lot of eggs which hatched well and the larvae were well fed on leaves of young hawthorn shoots, but their numbers grew less and less as they grew bigger. Finally about a dozen large ones only remained and then I found they were largely feeding on each other. Finally, when only two were left, I saw one of them finishing off its last meal on the other. It was a large caterpillar for the insect, and produced a moth, although a very undersized one, in September of that year. It should have waited till the following May. I was reminded of the sailor in the 'Bab Ballads.' Curiously enough I have, since then, reared many from eggs on the same food and have never had a cannibal or an autumn emergence."

THE SUGGESTION THAT "ASSEMBLING" MOTHS ARE ATTRACTED BY "WIRELESS."—Prof. POULTON drew attention to an article in the *Strand Magazine* (March, 1928, p. 267) in which Mr. J. J. Ward suggested that "assembling" males responded to a wireless call sent out by the antennae of the female. The fact that the female communicated her attraction to substances with which she had been in contact, and that, as Fabre states, porous substances retained the attraction longer than those with hard and polished surfaces, as also the ease with which the attraction could be stopped by closed receptacles, appeared to disprove this hypothesis. Furthermore, the attitude and movements of the "calling" female rendered it probable that the attraction emanated from the abdomen.

A REMARKABLE JASSID LARVA (HOMOPTERA) DISCOVERED BY G. M. HENRY IN CEYLON.—Prof. POULTON exhibited microscope slides on which the Jassid larva and



its exuvium were mounted, and also communicated the description and text-figures prepared by Mr. W. E. China. Mr. Henry had given the following account of the larva :—

“8 October, 1927 : Colombo Museum, Colombo, Ceylon.

“I am sending you a tube containing a curious Jassid nymph and its exuvium. It was taken by me on the underside of a leaf *Macaranga tomentosa* in jungle at Haputale. The peculiarity of the creature is in its resemblance to a Capsid bug, and when I caught it I believed it to be a Capsid until I had examined it, when I saw that the ‘head’ of the supposed Hemipteron was really the tail-end of a Jassid, with eye-like spot on each side and long cerci to represent the antennae. (One of these was unfortunately broken off.) The real eyes look very like the pigmented cuneus that is present in many Capsids.

“Unfortunately, I am unable to identify the species and have been unable to ‘match’ it with any Capsid in our collection, although it has a general resemblance to several species. I regret also that I was not able to find any more specimens.”

It was probable, although by no means certain, that the Homopterous larva described by Mr. E. E. Green (who had kindly called attention to the similarity) in *Proc. Ent. Soc. Lond.*, 1896, pp. xvii, xviii, was the same as that taken by Mr. Henry. On these pages it is recorded that Mr. Green “exhibited a larva of an Homopterous insect—one of the CICADINAE—from Ceylon, having what appeared to be a head at its caudal extremity. He pointed out that the larva had caudal appendages which might be mistaken for hairy antennae, and pigment spots resembling eyes on the antepenultimate segment of the body. The insect walked either backwards or forwards, and when first seen looked like a beetle of some kind, the caudal extremity representing the head.”

#### TERMINAL ABDOMINAL PROCESSES IN A JASSID LARVA (HOMOPTERA, JASSIDAE), by W. E. CHINA.

The Ceylonese Jassid larva which Mr. Henry has considered as resembling a species of CAPSIDAE, is provided with two long divergent filamentous processes arising from the apex of the abdomen, and greatly resembling the cerci in the Thysanura. These filaments, however, are not homologous with true cerci, but are merely postero-lateral extensions of the body-wall of the 9th segment. They are unsegmented, although superficially they appear to be so, owing to the fact that the surface of the chitin is multistriate and sparsely covered with hairs. The apices are closed, and end with one or more bristles. These processes are apparently only transitory in the larva, for no adult Jassid known to occur in Ceylon bears such appendages.

So little is known of the earlier stages of the Auchenorrhynchous Homoptera, especially of the JASSIDAE, that it would be presumptuous to say that the presence of terminal cerci-like appendages in the larvae of this species is remarkable, but, so far as is known, no such appendages have as yet been recorded.

Amongst the Hemiptera, however, there are several cases of the occurrence of abdominal processes. There is, of course, the long respiratory siphon in the NEPIDAE,

very long in *Ranatra* and *Laccotrephes*, and shorter in *Nepa*. This organ, which is present also to a less degree in the BELOSTOMATIDAE, consists of a pair of elongate processes from the 9th segment. In *Darthula*, a North Indian genus which has been doubtfully referred to the MEMBRACIDAE (subfamily AETHALIONINAE), the 9th abdominal segment is also produced posteriorly into two thick, hairy, tubular

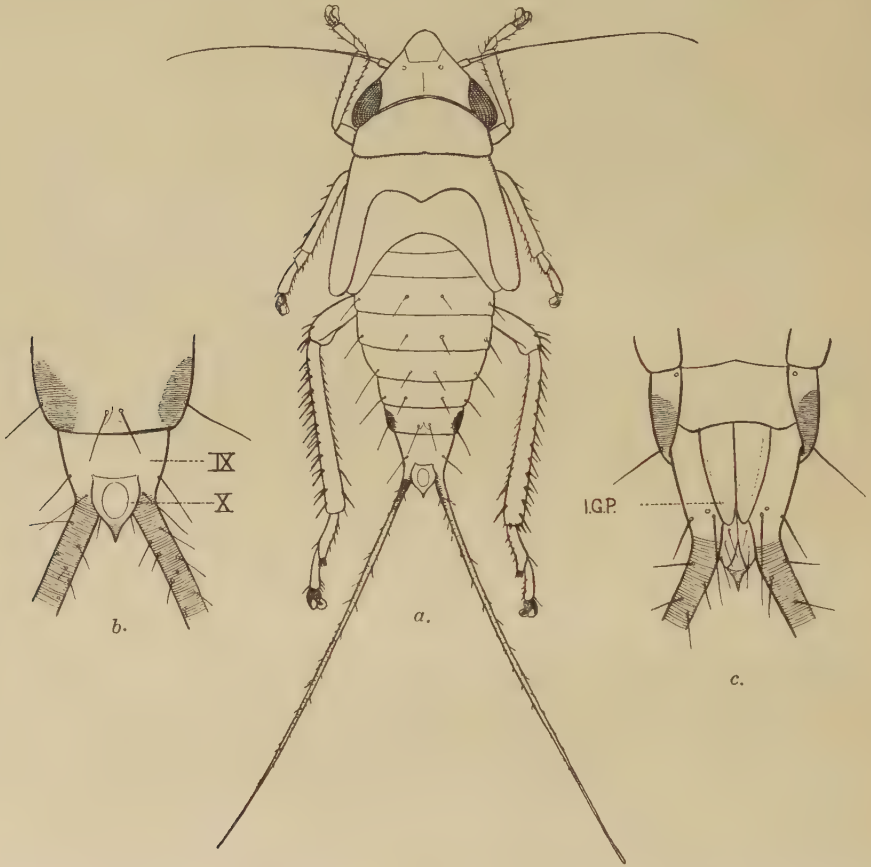


FIG. 1.—a. Dorsal view of Ceylonese Jassid larva showing terminal processes; b. terminal abdominal segments dorsal view; c. ventral view of same; IX. 9th segment; X. 10th segment; I.G.P. incipient genital plates.

processes, which adhere to one another, and are of doubtful function. In the ACHILIXIDAE (*Achilixius*), Muir has described two pairs of processes arising from the pleura near the base of the abdomen, while in the Cixiid genera *Benna* and *Bennaria* a single pair of such processes is found. The present writer has also seen an undetermined West African Pentatomid with a single pair of haltere-like appendages at the base of the abdomen. In the APHIDIDAE, the cornicles are sometimes long and filamentous as in the TRICHOSIPHINAE (*Greenidea*), but these arise from the 6th abdominal segment, are open at their apices, and are secretory



in function. My colleague, Mr. F. Laing, also tells me that in the Cervaphidina the abdominal segments are provided with spine-like processes which are actually modified hairs. In the COCCIDAE also there are examples of abdominal processes. In the DIASPINAE, for instance, Berlese has drawn attention to the paired sac-like organs on the abdominal sternites which he has called Pseudopodia, and which he believes are locomotory in function, and homologous with the rudimentary abdominal limbs of the Thysanura. In the males of *Monophlaebus* (MONOPHLEBINAE) the terminal abdominal segments are produced laterally into flexible, unsegmented structures, which may possibly act as balancing organs. In all these cases the abdominal processes are not a transitory phase in the larva only, but are well developed also in the adult insects. It is possible, of course, that this may be so in the case of the Ceylonese species. If so, it is to be hoped that at an early date Mr. Henry will be able to capture specimens not only of the alleged Capsid model, but also of the adult Jassid.

With regard to the function of the appendages other than that suggested by Mr. Henry's observations, since Jassid larvae of this type are active jumpers, such appendages would act well as balancing organs, especially as the insect is decidedly head-heavy.

Owing to our more or less complete ignorance of the immature stages of exotic JASSIDAE, it is impossible to assign the larva in question to any known genus. It is possible, however, that it belongs to the CICADELLINAE (TETTIGONIELLINAE), since the incipient ocelli are readily distinguishable on the dorsal surface of the head, a condition characteristic of that group.

AN INSECT-LIKE VEGETABLE GROWTH FROM UGANDA.—Mr. K. G. BLAIR exhibited a peculiar vegetable growth that had been received by Prof. Poulton from Dr. G. D. H. Carpenter from Ajumani, E. Madi, N. Uganda, and said that Dr. Carpenter had written concerning it: "one of the boys brought to me on June 18th here at Ajumani a thing on a stick broken off from a bush which he said he had not dared to touch for some time as it looked so evil. From the stick projects upwards and outwards what for all the world looks like a huge brown caterpillar, in the attitude sometimes adopted by large larvae, with the anterior segments thrown back so that the ventral surface shows, in a twisted attitude. But the terrifying part of this is a series of hooked claw-like structures all the way along the 'ventral' surface. Honestly when I first saw it I wondered whether it *was* the corpse of a larva killed by some fungus disease. . . . I have it drying—it sheds a fine dust of spores in the box."

On cutting into it, it was found to contain a large cavity with a quantity of what appears to be the frass of some larva, but it was doubtful whether such a larva was the cause of the formation of the growth or merely a secondary occupant of it. By cutting further into the growth the dead occupant or perhaps a cast skin might be found to throw further light on its nature. There are a few empty skins, probably of some Coccid, on the surface, but Mr. Laing to whom it was referred, did not think that these were the cause of the growth.

The specimen was then referred to Mr. J. Ramsbottom of the British Museum, who states that it is a kind of "smut," Ustilagineae—thus effectually disposing of the question of its insect origin.

A REMARKABLE LEPIDOPTEROUS PUPA FROM INDIA.—MR. W. H. T. TAMS communicated the following note from Mr. T. BAINBRIGGE FLETCHER and exhibited the specimen referred to.

“ Whilst looking up a reference in our volume of *Transactions* for 1883, my eye was caught by a figure, on page xxiv of the *Proceedings* for that year, of the defence for its pupa provided by the larva of the South American *Eunomia eagrus*, which is presumably *Macrocneme eacus*, Stoll, of Hampson's *Cat. Lep. Phal.* I, 326.



FIG. 2.—Unknown moth pupa, found at Shillong on an *Osbeckia* stem, defended by a barrier of larval hairs. Thrice natural size; a larval hair shown more highly magnified.—T.B.F.

“ This reminded me of a somewhat similar case which I came across at Shillong (Khasi Hills, Assam) some years ago. In this case the larva had fastened a silken rope spirally around the stem of a low-growing plant (a young *Osbeckia*, I think), and had fastened some of its hairs into this rope so as to project outwards at right angles to the stem of the plant, thereafter preparing its cocoon, which is also covered with non-erected hairs, at the upper end of the defended portion of the stem. It will be seen, from the enlarged sketch of a single hair, that the hairs themselves are

provided with recurved barbs well calculated to annoy any foe attempting to climb the stem.

"The moth had already emerged when this specimen was found, and I have never come across another example, so that the species concerned remains unknown for the present."

Mr. G. J. ARROW showed lantern slides to illustrate his paper on "Polymorphism in normal Beetles."

Dr. H. ELTRINGHAM gave an account, illustrated with lantern slides, of the silk glands in *Hilara*.

### Wednesday, March 21st, 1928.

Mr. J. E. COLLIN, President, in the Chair.

#### *Election of Fellows.*

The following were elected Fellows of the Society:—Major C. P. BRADSHAW, Cavalry Club, Piccadilly, W.; R. C. R. CREWDSON, The Grange, Delamere, Northwich, Cheshire; H. O. FRANCIS, 5, East Barnet Road, New Barnet, Herts; W. V. HARRIS, Asst. Entomologist, Dept. of Agriculture, Morogoro, Tanganyika Territory; G. SALT, The Bussey Institution, Forest Hills, Boston, Mass., U.S.A.; A. E. WINTER, 148, West End Avenue, Harrogate.

#### *Exhibits.*

NOTES ON MELANISM.—Mr. N. D. RILEY on behalf of Prof. J. W. HESLOP HARRISON, F.R.S., communicated the following notes:—

"Recently, at a meeting of the Entomological Society, my friend Mr. W. Mansbridge exhibited a series of melanic specimens of *Aplecta nebulosa*, *Boarmia repandata* and *Selenia bilunaria*. In connection with these he contributed some notes (Mansbridge, 1927) to the Proceedings of the Society, in which he claims to have produced melanism by means of controlled pairings, or by what he would term 'selection.' Although my name was mentioned in the notes, I awaited criticism of Mr. Mansbridge's views from others, before pointing out the fallacies underlying the whole of his arguments. As no one has referred to the matter, in view of the great danger in allowing his remarks to remain unchallenged, the following notes are penned.

"In discussing his *nebulosa* crossings he begins by pointing out that, as is well known, the form of *nebulosa*, known as *robsoni*, is heterozygous for melanism whilst *thompsoni* represents the homozygote.

"Up to this point he states nothing to which one can object. However, he continues by asserting that in four successive seasons by mating 'very dark typical variations,' he has secured 25 per cent. ordinary pale type *nebulosa*, 50 per cent. *robsoni*, and 25 per cent. of a form described as var. *plumbosa* in the progeny.

"At this stage many points require elucidation, and even cry out aloud for control broods and extensive experimental work in very many directions.

"By throwing his results into a form involving the use of very significant percentages, and by stating that these figures were obtained on four distinct occasions,



Mr. Mansbridge demonstrates that, instead of believing whole-heartedly that the results represent the effects of selection, he regards them more as matters of heredity. In other words, it stands out very clearly that his 'very dark typical variations' produce the forms encountered because their germinal composition permits them to do so.

"Either a 'very dark typical variation' is a mark of fluctuating variation depending on environmental or allied influences for its expression, or it has a germinal basis. If it has no germinal foundation, then no amount of selection will ever cause it to produce melanic forms, much less the very definite variety called *robsoni*, admittedly a heterozygote for melanism. Selection cannot create, it can only sift over, or combine, what is already there.

"What is indicated then is a series of experiments, carefully designed and carried out, to throw light on the germinal constitution of the insects employed. When this has been done we may rest assured that these forms, presumed to be typical (although with contradictory qualifications), will have revealed themselves to be zygotes, genotypically of a very complex type as far as melanism or melano-chroism is concerned.

"Next appears a statement that 'it follows from this \* that, if *robsoni* always give the results stated above, we have a clue to the genesis of melanism in nature.' 'The result stated above' is that according to Mendelian principles, since *robsoni* is heterozygous for melanism, when examples are paired *inter se*, they yield broods composed of types, *robsoni* and *thompsoni* in the ratio of 1 : 2 : 1. Here Mansbridge very naively assumes that the forms bred by pairing his 'very dark typical variations,' and classified by him on their phenotypical merits as *robsoni*, are also genotypically *robsoni*.

"This does not follow at all: for any such assertion to be permissible the alleged *robsoni* so reared should have been mated *inter se*, and back-crossed both on real types (not 'very dark typical' forms) and on *thompsoni*. I venture to predict that, under such rigid tests, they would fail to produce either in the first-named type of mating, or in the back-cross on types, types and *robsoni* in the ratios demanded by Mr. Mansbridge's assumptions.

"I do not deny that total melanics in certain cases such as *Spilosoma lubricipeda* var. *zatima* could be generated by mating intermediates of known genotypical build. This is only possible because in *lubricipeda* melanism, as Federley (1923) has shown, depends on a multiple factor system permitting of many combinations of its units.

"Mr. Mansbridge, however, deliberately excludes such an explanation by his careful preamble, in which, although he does not state it in so many words, he implies that melanism behaves in heredity as a so-called unit character.

"In the concluding paragraph dealing with *A. nebulosa* it is more than a little difficult to recognise what is meant by the phrase 'the black variations are difficult to breed as an F<sub>2</sub> generation in confinement.' If, as appears likely, this means rather a C<sub>2</sub> (a second cage-bred generation) lot of pure *thompsoni*, then it uncovers another feature in which many more experiments are necessary before this work can be regarded as of the slightest genetical importance. At present it fails to throw

\* *i.e.* the appearance of forms alleged to be *robsoni* in the offspring of "very dark typical variations."

the faintest light on the hereditary behaviour of melanism and melanochroism in *A. nebulosa*, or on what it presumes to suggest—a solution of the problem of melanism in Nature.

“The *Boarmia* work suffers from the same defects. True it is that in Huddersfield, Gateshead, Silesian and other strains of *B. repandata* var. *nigra* melanism behaves as a Mendelian dominant, as both Mansbridge and myself have proved. The same holds true of the allied *Tephrosia crepuscularia* var. *delamerensis*, but everyone knows that both species exhibit a wide range of melanic and melanochroic examples, and that in both forms known to be genotypically melanics seem to the eye almost typical.

“To illustrate this, let me refer to one of my own papers (Harrison, 1923). In that publication a female of mixed *bistortata*-*crepuscularia* origin, but owing its melanism to *T. crepuscularia* var. *delamerensis*, was described as ‘nearly’ type. This, when crossed with a male, phenotypically and genotypically a type, yielded eighteen well-characterised melanics and seventeen types as offspring. Clearly, the ‘nearly’ type had been heterozygous for melanism, for those figures mean that in the back-cross on type the characteristic 1:1 ratio had emerged.

“Again Mr. Mansbridge’s ‘selected very dark’ moths should have been subjected to carefully planned genetical experiments, as also ought his ‘types’ and ‘var. *nigra*’ in their progeny. On his facts, and on the previous work of others, he is not entitled to call the pale insects reared ‘types’ or the black insect ‘var. *nigra*’ in any discussion in which germinal conditions are to be taken into account—and such must be the case if the subject dealt with is the genesis of melanism in Nature.

“Turning now to the *Selenia bilunaria* cultures: here we are definitely assured that a deliberate selection was practised over four generations, and once more we have employed a symbol ‘ $F_4$ ’ which, to be correct, should be  $C_4$  (the fourth cage-bred generation). In the last batch reared (that labelled  $F_4$ ), we are informed that there appeared thirty insects. Of these five showed a ‘strong tendency to melanism,’ whilst two others were ‘almost as dark.’ Taking cognisance of the variation observed in the melanic cultures of this species (Harrison and Garrett, 1926; Harrison, 1928), if Mr. Mansbridge is justified in his ideas that these experiments have some bearing on the induction of melanism, we are entitled in combining the five and the two to form a total of seven. Thus the brood includes twenty-three types and seven melanics. From this we gather that in the  $C_4$  lot, the types\* were to the melanics in the ratio of 23:7 or 3.3 to 1—a figure agreeing well with the ratio of 3.4:1 for the massed broods, reared from heterozygous types, in the work of Harrison and Garrett.

“If this means anything at all, and it almost certainly does, it indicates that, in selecting the darkest individuals in his ‘ $F_3$ ’ batch to secure his ‘ $F_4$ ’ lot, Mansbridge has chosen insects heterozygous for melanism. This he would naturally do as the heterozygotes in *Selenia bilunaria* are distinctly darker than the pure types. This implies, therefore, that the ‘ $F_3$ ’ brood already carried melanism in the recessive condition.

\* Unlike what holds for *A. nebulosa* and *B. repandata*, in *S. bilunaria* melanism is a Mendelian recessive.

"Hence two possibilities lie open: (1) that melanism was always previously latent in the strain employed, and that in his choice of parents for his 'F<sub>2</sub>' and 'F<sub>3</sub>' generation he had taken one homozygous and one heterozygous type, or (2) that, in breeding his 'F<sub>2</sub>' and 'F<sub>3</sub>' lots, he had induced the melanism by the use of contaminated food. In view of the known record of Delamere Forest in the production of melanic species, the former seems the more probable in the absence of all control broods, but the latter is not excluded.

"To conclude, in my opinion, so far from succeeding in developing melanism, Mansbridge has only produced a series of facts which, when due attention is paid to the lack of tests as to the germinal nature of the material employed, fail to fall into their places in any connected story."

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THE MOUTH-PARTS IN SOME INSECTS.—Mr. DONISTHORPE explained the structure of the mouth-parts in various insects, especially ants, with the help of some very clear and excellent drawings executed by Miss Kirk on the black-board.

He compared the labium of Coleoptera, Orthoptera, and Hymenoptera, and said that the subject was made more difficult because various authors had called the same parts by different names. That owing to the excellent work of Meinert, Forel, Nessonow, Janet, Emery and Wheeler on the anatomy of ants, there was practically nothing to add to the chapters on the structure of ants, when he came to prepare the 2nd Edition of *British Ants*.

Bugnion, however, had recently done some fine work on the mouth-parts of ants, and, among other points, he did not consider that what myrmecologists had called the paraglossae in ants were the homologues of those structures in other insects, but corresponded with the organs in wasps which du Buysson had called the "râteaux." In the wasps they were used for chewing the food, but in ants they were used for toilet purposes, and Forel had originally called them the combs.

Bugnion also considered that what was known as the hypopharynx should be called the labial groove, and the sclerites of the hypopharynx, discovered by Huxley in the bee, should be called the "baguettes de Huxley." Finally Mr. Donisthorpe described the structure and use of the infrabuccal chamber, which he said he



believed was only found in ants; and he agreed with Bugnion that what myrmecologists had called the paraglossae in ants should be called the *râteaux*.

A NEW INDIAN SPECIES OF THE GENUS *LYCAENOPSIS*, FELD.—Captain A. F. HEMMING exhibited specimens of a new Indian *Lycaenopsis* and communicated the following note :—

“ Lt.-Colonel H. D. Peile, I.M.S., recently put at my disposal a number of specimens of *Lycaenopsis*, regarding the identity of which he was doubtful. These specimens form part of a series (a large part of which is now in the British Museum), which Colonel Peile caught at Mussourie in the years 1912–1914 and 1916. They were separated into the following two groups by Colonel Peile at the time of capture, viz. :—

(a) An insect resembling what is usually called *huegelii*, Moore (1882) [species A].

(b) A similar but larger insect [species B].

“ Preparations of the genitalia of a number of specimens belonging to each group show that two quite distinct species are involved. The first point to ascertain was whether either of these species was the *huegelii* of Moore. Fortunately it was possible to settle this question without difficulty as the British Museum collection contains one of Moore’s ♂ co-types (Masuri, Moore coll.), the genitalia of which have been dissected. In the same collection there is a preparation of the genitalia of a paratype of *oreas*, Leech (1893). Comparison of these preparations with those made from Colonel Peile’s insects shows :—

(1) that, species ‘ A ’ is true *huegelii*, Moore;

(2) that *oreas* is a subspecies of *huegelii* and not a distinct species as it has hitherto been considered;

(3) that species ‘ B ’ is distinct from both *huegelii* and *oreas*, and is apparently a new species.

“ The next step was to examine the original descriptions of any species or subspecies of *Lycaenopsis* which might prove to be species ‘ B.’ This gave the following result :—

(i) *Lycaena coelestina*, Kollar (1844). This is quite different from, and much smaller than, species ‘ B.’

(ii) *Lycaena kollari*, Westwood (1852). This is simply a new name proposed by Westwood in substitution for *coelestina*, Koll. This change is necessary as Kollar’s *Lycaena coelestina* is a primary homonym of *Lycaena coelestina*, Ev.

(iii) *Polyommatus kasmira*, Moore (1865). This is merely a synonym of *kollari*.

(iv) *Lycaenopsis oreana*, Swinh. (1910). Swinhoe’s type and paratypes are in the British Museum. *Oreana* is the race of *huegelii* from the Khasia hills.

(v) *Lycaenopsis trita*, Swinh. (1919). The two types from Murree (in the British Museum) are merely *kollari*.

(vi) *Lycaenopsis huegelii oreoides*, Evans (1925). The type and paratypes are in the British Museum. This is the subspecies of *huegelii* from elevations above 8000 ft. from Sikkim to Assam.

“ Species ‘ B ’ cannot be referred to any of the above, I therefore propose for it the name :—

*Lycaenopsis gigas*, sp. nov.

Nearest to *Lycaenopsis huegelii*, Moore, from which it differs as follows :—

♂♀. Apex of fore-wing truncate; cilia fairly heavily chequered with black.

♂ *Upperside*. Ground-colour pale purplish-blue (deep purplish-blue in *huegelii*); veins outlined with apparently paler scales; paler scales on costa of fore-wings very prominent (these are absent in *huegelii*); black marginal band to fore-wings wider at apex instead of being of same width throughout.

♀ *Upperside*. Black border to fore-wings broader than in *huegelii* and wider along termen than along the costa instead of being of equal width along the termen and the costa as in *huegelii*; black marginal border to fore-wings continued inward for half the length of the inner margin, instead of less than one-third of the length as in *huegelii*; veins on both wings not outlined with black to any great extent (conspicuously outlined in *huegelii*).

♂♀ *Underside*. Distance from spot in Interspace I.B. (Spot X) to double spot in Interspace I.C. (Spot Z) greater than from spot in Interspace 2 (spot Y) to spot Z, i.e.  $XZ > YZ$ . In *huegelii* the distance from X to Z is approximately equal to that from Y to Z, i.e.  $XZ = YZ$ . In *gigas* the angle XYZ is approx.  $75-80^\circ$ , in *huegelii* approx.  $45^\circ$ . The spot in Interspace 3 is of equal size to the other spots in the series in *gigas*, but is absent or vestigial in *huegelii*. In *gigas*, the elongate spot in Interspace I.B. is placed at right angles to vein IA., but at approx. 50 per cent. in *huegelii*.

*Average length of fore-wings*: 20 mm. (*gigas*); 17 mm. (*huegelii*).

*Habitat*: Kalapaui, Mandi, Chumbi (Chamba), Dalhousie, Dana, Kangra, Narkundah, Simla, Mussourie.

♂ *Holotype*. Mussourie, 29.4.1913. H. D. Peile (B.M. Type No. Rh. 288).

♀ *Allotype*. Mussourie. 8.6.1912, H. D. Peile (B.M. Type No. Rh. 289).

Paratypes from above localities in B.M. (♂ 64, ♀ 34) and from Mussourie in Peile coll. (♂ 23, ♀ 14) and in Hemming coll. (♂ 7, ♀ 1).

"In his original description of *L. huegelii*, Moore gave as localities 'Kashmir, Simla, Masuri and Dharmasala.' His Kashmir example is no longer in the B.M. series, which however contains specimens from the following localities, viz. :—Dugi, Dana, Kujiar, Dalhousie, Mussourie and Kumaon (Naini Tal). The two species appear therefore to have approximately the same Western boundary (Kashmir), but *huegelii* seems to occur further east than *gigas* as there are no specimens of the latter from Kumaon. Colonel Peile informs me that at Mussourie he took most of his specimens of *L. gigas* in the Dhobi Ghat ravine at 5500 ft., and in the Pumping Station nullah at about the same elevation. Others were taken in the terraced fields in the nullah leading to the Aglar nullah. One of two were caught on the Simla road fairly high up at about 6000 ft. and one in the Park at 6500 ft.

"Colonel Peile's captures of *gigas* cover the months April (end), May, June (a few), August, September, and October. *L. huegelii* was taken in April (end), May, June (plentiful), July 4th (one ♂), August and October. The spring emergence of both species thus appears to begin at the same time, but *gigas* is practically over by the end of May though *huegelii* is plentiful until the second or third week in June. The August–October emergence of both species is only very partial.

"Camera lucida sketches drawn to the same scale (Plate II) are given of the genitalia of *gigas* (A.F.H. coll. No. 21486), *huegelii* (coll. No. 21493), *kollari* (coll. No. 21471) and *argiolus* (coll. No. 21689). The last named has been included partly for purposes of comparison and partly because both *huegelii* and *kollari* have at times in the past been treated as races of *argiolus*. The differences in the genitalia





EXPLANATION OF PLATE II.

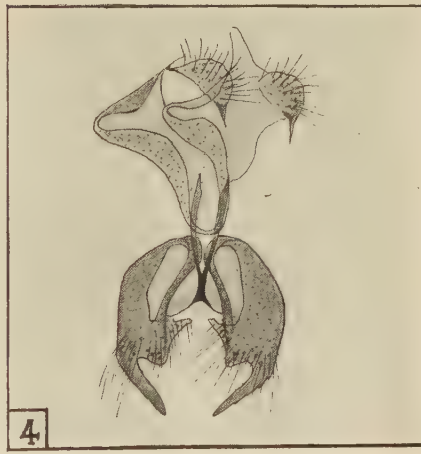
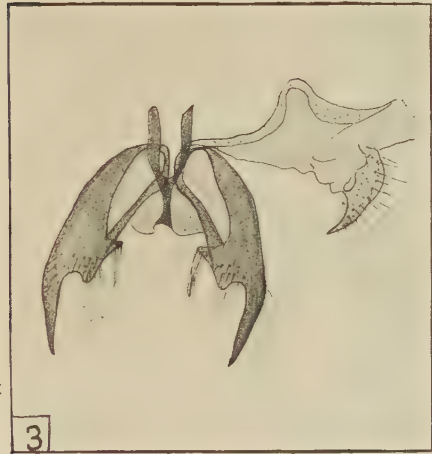
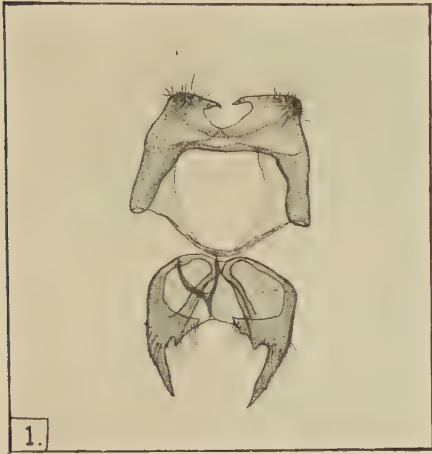
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Male armatures of the genus *Lycaenopsis*.

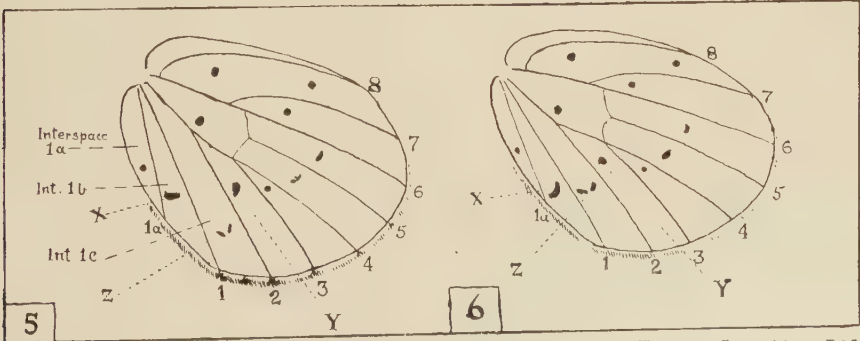
- FIG. 1. *L. kollari*, Westw. (= *coelestina*, Koll.). Mussourie, 21.5.1913.  
2. *L. argiolus*, Linn. Var, La Sainte Baume, 10.8.1927.  
3. *L. gigas*, Hemming. Mussourie, 24.6.1913.  
4. *L. huegelii*, Moore. Mussourie, 2.6.1913.

Underside Hind-wings (outline).

5. *L. gigas*, Hemming.  
6. *L. huegelii*, Moore.



V.M.H. del.



H.D.P. del.

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MALE ARMATURES IN THE GENUS *LYCAENOPSIS*.





are, I think, such as to justify the grant of specific rank to *kollari* as well as to *huegelii* (now generally accepted as a good species) and to *gigas*. The main points of difference in the genitalia are summarised in the following table:—

	<i>L. gigas</i> .	<i>L. huegelii</i> .	<i>L. kollari</i> (= <i>coelestina</i> ).	<i>L. argiolus</i> .
CLASP. (i) Distal portion (ventral spine (Chapman)).	Long, recalling that of <i>argiolus</i> , but more sharply upcurved from ventral line; no teeth on outer edge.	Relatively short and sharply upcurved. Four or five teeth on outer edge.	Relatively short, recalling that of <i>huegelii</i> , but less sharply upcurved and longer in relation to remainder of clasp. Three or four teeth at base.	Long and tapering, only slightly bent at the tip inward from ventral line. Four or five small teeth at base.
(ii) Proximal projection on dorsal edge.	Very slight.	Prominent and long, point curved inward.	Very prominent, long and pointed upwards.	Relatively slight.
(iii) Distal projection on dorsal edge.	Slight, end rounded.	Prominent, end fairly sharply pointed.	Small, but sharply pointed.	Slight, but more prominent than in <i>gigas</i> .
(iv) Membranous portion.	Small, subtriangular in shape.	Small, subquadrangular.	Large, but chitinated outer proximal portion of clasp fairly broad.	Very large, chitinated outer proximal portion of clasp very narrow.
Transtilla.	Base stout, lateral portions short and massive.	Base stout, lateral portions long and tapering.	Base slender, lateral portions slender and relatively short.	Base slender, lateral portions slender and relatively long.
Spine on lateral lobes of uncus.	Very large and massive.	Slight, very sharply pointed.	Short and very slight.	Short and very slight.

DR. V. G. L. VAN SOMEREN ON INTERMEDIATE VARIETIES BETWEEN THE DANAINÉ BUTTERFLIES *DANAIDA* (*MELINDA*) *FORMOSA*, GODM., AND *MERCEDONIA*, KARSCH, IN THE AREA BETWEEN THEIR RESPECTIVE RANGES.—Prof. POULTON said that he had just received the following interesting observation from his friend Dr. van Someren at Nairobi:—

“16 February, 1928.—It is I think worthy of record that *Melinda formosa* and *mercedonia* are apparently one species, being merely geographical forms. I say this because when arranging this group I found one specimen from Kaimosi (about 20 miles N.E. of Kisumu) placed in *mercedonia* and another in *formosa*; but neither were typical of the form they were put with. This led me to go over all the examples in papers from this locality and Nandi and Maragoli (a ridge of little hills N.N.E. of Kisumu). I was able to find no less than sixteen which are intermediate between *formosa* and *mercedonia*, together with two typical specimens of *formosa* and two of *mercedonia*. Now the interesting point to my mind is the fact that in the locality where we get these intermediates one should find an intermediate form of the mimic, viz. *Papilio rex commixtus*, Auriv.”

It was hoped that the evidence of the male armature would be brought before a future meeting and that Dr. van Someren would send examples of these intermediates for exhibition. The relationship between *mercedonia* and *morgenii*, Honr., also required investigation in the light of this interesting discovery, as also the long series of *formosa* and the few *mercedonia* from the N.E. Victoria Nyanza, recorded by Dr. S. A. Neave in *Nov. Zool.*, xi., 1904, pp. 344, 345, and *Trans. Ent. Soc. Lond.*, 1906, pp. 215, 216.

A REVERSAL OF THE USUAL GEOMETRID TWIG-LIKE ATTITUDE IN A LEAFSTALK-LIKE LARVA OF THE GENUS *CABERA*.—Prof. POULTON said that when staying at St. Helens, Isle of Wight, in August, 1927 a smooth green Geometrid larva was found feeding on sallow by his grandson, E. M. Poulton, of Rugby School. The larva was kept in a glass cylinder of ample size and watched from day to day until, on 25 August, it spun a cocoon on the twig of its food-plant. At some time between 12 and 15 March, 1928, the moth emerged and proved to be *Cabera exanthemata*, Scop., its early appearance being accounted for by the fact that the cocoon had been kept in a warm room. The larva was always observed to be attached by its claspers to a leafstalk or some part of a leaf, the projecting midrib of the under surface being often chosen. From this support the body hung, making an acute angle with the twig of sallow which was clasped by the true legs. The straight, smooth, green larva thus closely resembled a leafstalk rising obliquely upwards, its base being convincingly suggested by the thoracic segments and smooth rounded head lying along the twig. Among the numerous leafstalks seen all around in looking at a sallow-bush, the fact that one apparent stalk was not attached to the right part of a leaf would not attract attention; although in this, as in other instances, a more or less complete failure of the instinct would doubtless lead to the detection of a certain proportion of the larvae. Miss Balfour had observed that, when she found wild Geometrid larvae, her success was always due to some failure in the instinctive procryptic attitude. Such larval attitudes were also powerfully affected by the crowding which is so common in breeding-cages. Hence, in repeating these observations on the larvae of *Cabera* and other Geometers with smooth green caterpillars of about leafstalk size, it will be best to observe single examples in separate cages with plenty of room and a natural arrangement of the food-plant. It was possible that the observations here recorded might lead to the recognition of a whole group of Geometrid larvae which resemble leaf-stalks and assume a position the reverse of that adopted by their relatives exhibiting the well-known resemblance to side-twigs.

THE MADEIRAN MOTH *BLASTOBASIS LIGNEA*, WLSM. (TINEINA), TAKEN IN N.E. IRELAND IN 1902.—Prof. POULTON said that to his great surprise he had received the following note from his friend Prof. E. G. R. WATERS, who was unable to be present and communicate the record which he had discovered.

"14 March 1928.—While looking up some Tineina in the British collection (Hope Department) this afternoon, I came across a specimen of *Blastobasis lignea*, Wlsm., bearing the label 'N.E. Ireland. Capt. last half of Sept. 1902 and pres. 1902 by E. B. Poulton.' It is placed incorrectly with some *Gelechia proximella*. The specimen is of great interest, because *B. lignea* is a Madeiran insect, and was introduced only very recently to the British list—see *Entomologist*, 1922, p. 145. So far as is known, it is still restricted in Britain to a small area in North Lancashire and Westmoreland (where I found it commonly last summer). Your specimen extends its range to Ireland, and adds fifteen years to the known career of the species in this country. I wonder if you can add any details as to where and how it was obtained? I hope you will be willing to publish a note about it."

It was unfortunately impossible, after the lapse of nearly twenty-six years, to add any precise details of time or place; but it was certain that the moth was taken

## REPORT OF THE BRITISH NATIONAL COMMITTEE ON ENTOMOLOGICAL NOMENCLATURE.

### INTRODUCTION.

THE British National Committee on Entomological Nomenclature, as also any other National Committees that may be in existence, owe their origin to the International Congress of Entomology held at Oxford in 1912.

Among other duties assigned to these Committees were the following :

To consider what elucidations, extensions and emendations, if any, are required to the International Code.

To lay a report on these points before the next [Third] Congress of Entomology.

In fulfilling the duties indicated above, the British National Committee on Entomological Nomenclature, since September 1924, have been considering how to elucidate and simplify the Articles of the Code, as the confusion now existing in the interpretation of some of the Articles is considerable. These varied interpretations have in many cases led to the ignoring of some rules, and to the over-emphasising of the importance of others. Experience has shown that in some instances adherence to the very letter of the code has involved a departure from the spirit of certain Articles.

The Report of the Committee was circulated in 1925, and was also brought before the III. International Congress of Entomology at Zürich in July of that year, when at the last General Meeting of the Congress, held on July 25, the following resolution was passed, *nemine contradicente* :

“The Congress resolves that the revised rules of Nomenclature placed before the Congress by the British National Committee be accepted as a basis for further deliberations regarding a revision of the rules of Zoological Nomenclature.”

Since then the British National Committee has continued its work on the revision of the rules, and has taken account of a considerable volume of correspondence from entomologists at home and abroad, received in response to the invitation embodied in their 1925 Report, with the result that they are now able to offer the present report for consideration. The Committee, though fully aware of the necessity of re-coding the International Rules of Zoological Nomenclature, have decided not to depart further from the present arrangement of those rules than they did in their earlier report, in order to facilitate comparison with the existing International Rules (Monaco, 1913, republished in the *Proceedings of the Biological Society of Washington*, Vol. 39, pp. 75–103, 1926).

This revised report will duly be brought before the IV. International Congress of Entomology to be held at Ithaca, N.Y., U.S.A., when it is hoped that such action may be taken as will encourage the Committee to forward it, or a modified form of it, to the International Commission on Zoological Nomenclature.



The British National Committee accordingly invite all entomologists who are seriously interested in nomenclature to give this revision their fullest consideration, and to send their criticisms or comments to Professor J. Chester Bradley, Cornell University, Ithaca, New York, United States of America, or, after the conclusion of the Congress, to Dr. K. Jordan, Zoological Museum, Tring, Herts., England.

(Signed) G. T. BETHUNE-BAKER (*Chairman*).

J. E. COLLIN.

K. JORDAN.

G. A. K. MARSHALL.

S. A. NEAVE.

L. B. PROUT.

B. P. UVAROV.

J. WATERSTON.

W. H. T. TAMS (*Secretary*).

It was unanimously agreed, except in regard to Article 22, Clauses (g) and (l) on p. 6 R, that the revision be placed before the Congress in the form here presented.

## RULES OF ENTOMOLOGICAL NOMENCLATURE.

Proposed by the British National Committee on Entomological Nomenclature.

### GENERAL CONSIDERATIONS.

**Article 1.**—Zoological nomenclature is independent of botanical nomenclature in the sense that the generic name of an animal is not to be rejected simply because it is identical with the generic name of a plant. If, however, an organism is transferred from the vegetable to the animal kingdom its botanical generic name is to be accepted in zoological nomenclature with its original botanical status;\* and if an organism is transferred from the animal to the vegetable kingdom its generic name retains its zoological status and cannot be used again in zoology.

**Article 2.**—In referring to animals the scientific formula used shall consist of one name in the case of a genus or any higher group, two names in the case of a species, and three names in the case of a subspecies.

No further "name" † shall be added to a scientific formula without a qualifying prefix such as var., ab., etc.

**Article 3.**—The scientific names of animals must be words which are either Latin or Latinized, or considered and treated as such in case they are not of classical origin.

### FAMILY AND SUBFAMILY NAMES.

**Article 4.**—The name of a family is formed by adding the ending IDAE, the name of a subfamily by adding INAE, to the stem of the name of one of the included genera, which would then be regarded as the type genus.

\* "with its original botanical status" might be omitted.

† "names," see Article 14.

**Article 5.**—The name of a family is not to be changed unless it is a homonym, or unless the name of its type genus is transferred to another family or is proved to be a homonym of a genus in another family. In each of these cases the name must be changed and based on the valid name of the type genus.

The same rule applies to the name of a subfamily.

#### GENERIC AND SUBGENERIC NAMES.

**Article 6.**—Generic and subgeneric names are subject to the same rules, and from a nomenclatural standpoint they are co-ordinate, that is, they are of the same value.

**Article 7.**—A generic name becomes a subgeneric name when the genus so named becomes a subgenus, and *vice versa*.

**Article 8.**—A generic name must consist of a single word, simple or compound, written with a capital initial letter, and employed as a substantive in the nominative singular. Examples: *Apis*, *Musca*, *Stenocorus*, *Crioceris*, *Stenus*.

**Article 9.**—If a genus is divided into subgenera, the name of the typical subgenus must be the same as the name of the genus.

**Article 10.**—When it is desired to cite the name of a subgenus, this name is to be placed in parentheses between the generic and specific names. Example: *Carabus (Carpathophilus) linnei*.

#### SPECIFIC AND SUBSPECIFIC NAMES.

**Article 11.**—Specific and subspecific \* names are subject to the same rules, and from a nomenclatural standpoint they are co-ordinate, that is, they are of the same value.

**Article 12.**—A specific name becomes a subspecific name when the species so named becomes a subspecies, and *vice versa*.

**Article 13.**—All specific and subspecific names are to be written with a small initial letter.

**Article 14.**—The term used as a “ name ” for any concept lower than subspecies has no status in respect of priority, the accepted meaning of subspecies being a geographical or (in the case of parasites) host variation.

If it is desired to cite the subspecific name, such name is written immediately following the specific name, without the interposition of any mark of punctuation. Example: *Polyptychus grayi niloticus*, but not *Polyptychus grayi (niloticus)* or *Polyptychus niloticus*.

#### FORMATION, DERIVATION AND ORTHOGRAPHY OF ENTOMOLOGICAL NAMES.

**Article 15.**—The original orthography of a name is to be preserved unless an error of transcription, a *lapsus calami*, or a typographical error is evident.

#### AUTHOR'S NAME.

**Article 16.**—The author of a scientific name is that person who first publishes the name as laid down in Article 18, unless it is clear from the contents of the

\* See Article 14.

publication that some other person is responsible for the said name and its definition. Example: Westwood or Duncan (Jardine's Naturalists' Library) (see M. l'Abbé J. de Joannis, *Ann. Soc. ent. France*, xcv, pp. 1-11, 1926).

#### PUBLICATION.

**Article 17.**—Matter printed and offered for sale constitutes publication. Printing shall include only methods of reproduction by which an edition is printed from one original.

Publication of new names in newspapers, sale catalogues and prospectuses does not validate such names.

#### THE LAW OF PRIORITY.

**Article 18.**—The valid name of a genus can only be that name under which it was first designated, on the condition:

(a) That this name was published and accompanied by a definition in words of the genus concept, or by a reference to a previous such definition.

(b) That the author has shown that he adopts the principles of binominal nomenclature.

The valid name of a species can only be that name under which it was first designated, on the condition:

(c) That this name was published and accompanied by a definition in words, or by a reference to a previous such definition.

(d) That in the absence of a definition in words the name was accompanied by a figure, as in the case of Lepidoptera and some other groups.

(e) That the author has applied the principles of binominal nomenclature.

[N.B. Zoological Nomenclature:

Amendments to the International Code.

(International Congress of Zoology, Budapest, 1927.)

“Article 25. The valid name of a genus or species can only be that name under which it was first designated on the condition:

(a) That (prior to January 1, 1931) this name was published and accompanied by an indication, or a definition, or a description; and

(b) That the author has applied the principles of binary nomenclature.

(c) But no generic name nor specific name published after December 31, 1930, shall have any status of availability (hence, also, of validity) under the rules unless and until it is published either:

(1) With a summary of characters (seu diagnosis; seu definition; seu condensed description) which differentiate or distinguish the genus or the species from other genera or species;

(2) Or with a definite bibliographic reference to such summary of characters (seu diagnosis; seu definition; seu condensed description).

And further:

(3) In the case of a generic name, with the definite unambiguous designation of the type species (seu genotype; seu autogenotype; seu orthotype).”]



**Article 19.**—The tenth edition of Linné's *Systema Naturae*, 1758, is the work which inaugurated the general application of binominal nomenclature in zoology. The date January 1st, 1758, therefore, is accepted as the starting-point of zoological nomenclature and of the Law of Priority.

**Article 20.**—The Law of Priority also obtains and consequently the oldest name available is retained in the following cases :

- (a) When an animal is named from a part only, before the animal itself;
- (b) When any stage in the life-history is named before the adult;
- (c) When the two sexes of an animal have been considered as belonging to different species or even to different genera;
- (d) When an animal represents one of a regular succession of dissimilar generations which have been considered as belonging to different species or even to different genera.

But this rule will not apply to names based upon galls and leaf-mines produced by insects, in the case of which the name given to the insect itself shall take precedence of the name given to the gall or mine, even if the latter is of earlier date.

**Article 21.**—A genus formed by the union of two or more genera or subgenera takes the oldest valid generic or subgeneric name of its components. If the names are of the same date, that selected by the first reviser shall stand.

The same rule obtains when two or more species or subspecies are united to form a single species or subspecies.

**Article 22.**—The designation of type species of genera shall be governed by the following rules :

(a) The application of a generic name is dependent upon, and must follow, its type species (genotype).

(b) When a genus is divided into two or more restricted genera, its valid name must be retained for one of the restricted genera. If a type has already been established for the said genus, the generic name is retained for the restricted genus containing the said type.\*

(c) A genotype must be one of the species originally included in the genus, with the exception that species which were *species inquirendae* from the standpoint of the author of the generic name at the time of its publication, and species which the author doubtfully referred to it, are excluded.

(d) A genotype shall be considered validly designated by the original describer of the genus :

- (1) When one of the species from which the description is taken is definitely designated as type. (Type by original designation.)
- (2) When a genus is proposed with a single original species. (Monotypical genera.)
- (3) When a genus without originally designated type contains among its original species one possessing the generic name as its specific or subspecific name, either as valid name or synonym, that species or subspecies becomes type of the genus. (Type by absolute tautonymy.)

\* Article 22 of 1925 Report.

(e) Failing such designation by the original describer any subsequent author may choose one from among the original species remaining available, as the genotype, by definitely quoting such species as the type.

(f) Any author shall be considered to have limited the species from among which the type may be chosen, by :

(1) Dividing the old genus into sections defined in words, and giving other generic names to all except one of the sections.

(Limitation to the species in that section.)

(2) After defining the genus, quoting certain species as typical or intentionally restricting the application of the generic name to some only of the original species of the genus.

(Limitation to the species quoted.)

(3) Removing one or more species from the old genus, if at the same time pointing out the generic differences from that genus.

(Limitation to the species left in the old genus.)

(g) It shall not be considered a valid designation of a genotype if an author quotes an earlier name for, or a name which is synonymous with the name of, a species originally included in the genus, unless the name of such original species is quoted or the synonymy is given at the same time.\*

(h) If the elimination of a species in accordance with the above rules and the designation of that species as type by some other author should both be of the same date, the type designation shall be invalid.

(i) When the name of an original species in an old genus is found to be an earlier name for a species belonging to a different genus, the elimination of such a species from the old genus shall date only from the time the synonymy is definitely established. (Elimination at the time of synonymy.)

(j) In cases where the species quoted as the genotype is older than the genus concerned, the true type is the specific concept of the author of the genus and not necessarily the specific name.

(k) When a new generic name is proposed solely as a substitute for another generic name the two must be treated in every respect as absolute synonyms and cannot have separate types.

(l) If a genus is described without a species being mentioned, the first reviser has the right to select any species as the type, provided that it agrees with the original definition of the genus.†

**Article 23.**—The division of a species into two or more restricted species is subject to the same rules as the division of a genus. But a specific name which undoubtedly rests upon an error of identification cannot be retained for the mis-determined species even if the species in question are afterwards placed in different

\* One member of the Committee (Mr. B. P. Uvarov) dissents from the acceptance of this clause as regards its retrospective application.

† The following members of the Committee dissent from the acceptance of this rule because it validates genera to which, at the time of publication, the author did not ascribe any species by name.

(Signed) J. E. COLLIN.  
L. B. PROUT.  
J. WATERSTON.

genera. Example: *Sphinx parce*, Fabricius, 1775 = *Hemeroplanes parce*, Fabricius, but the species erroneously determined by Burmeister, 1855, as "*Sphinx parce*, Fabr." = *Madoryx bubastus*, Cramer.

#### REJECTION OF NAMES.

**Article 24.**—A generic or a specific name, once published, cannot be rejected, even by its author, because of inappropriateness.

**Article 25.**—A name is not to be rejected because of tautonymy, that is, because the specific or the specific and subspecific names are identical with the generic name. Example: *Cossus cossus*.

**Article 26.**—A generic name is to be rejected as a homonym when it has previously been used for some other genus of animals.

**Article 27.**—A specific name is to be rejected as a homonym when it forms part of the same combination of generic and specific names that has been previously used in the original description of another species. (Primary homonym.) (But see also Article 1.)

When, in consequence of the union of two genera, two different animals having the same specific or subspecific name are brought into one genus, the more recent specific or subspecific name is to be rejected as a homonym. (Secondary homonym.)

Specific names of the same origin or meaning shall be considered homonyms if they are distinguished from each other only by the following differences:

(a) The use of *ae*, *oe*, and *e*, as *caeruleus*, *coeruleus*, *ceruleus*; *ei*, *i*, and *y*, as *cheiropus*, *chiropus*; *c* and *k*, as *microdon*, *mikrodon*.

(b) The aspiration or non-aspiration of a consonant, as *oxyrynus*, *oxyrhynchus*.

(c) The presence or absence of *c* before *t*, as *auctumnalis*, *autumnalis*.

(d) By a single or double consonant; *litoralis*, *littoralis*.

(e) By the endings *ensis* and *iensis* to a geographical name, as *timorensis*, *timoriensis*.

**Article 28.**—A primary homonym can never again be used.

**Article 29.**—Names rejected as synonyms or secondary homonyms can again be used when it is proved that they have been erroneously suppressed.

#### RECOMMENDATIONS.

The recommendations are in the nature of advice, and have not the force of laws as in the case of the Articles of the Code. For this reason a departure from the form of the last Code has been made, in separating the recommendations and appending them to the rules, with references to the Articles to which they relate.

##### At Articles 1-3 (General Considerations).

A.—It is very desirable that the proposition of every new systematic group should be accompanied by a diagnosis, both individual and differential, of the said group in English, French, German, Italian, Spanish, Portuguese or Latin. This diagnosis should state in what museum the type specimen has been deposited and should give the museum number of the said specimen.

B.—It is recommended that in published descriptions of a new species or of a



new subspecies, only one specimen should be designated as *type*. The specimen itself should be labelled *type*. The other specimens examined by the author at the same time are *paratypes*.

C.—In publications issued in any language other than English, French, German, Italian, Portuguese, Spanish or Latin, it is very desirable that the explanation of the figures should be translated into one of these tongues.

D.—For scientific names it is advisable to use some fount of type other than that used for the text. Example: *Acherontia atropos*, Linné, 1758, is one of the sound-producing moths.

E.—The metric system of weights and measures and the centigrade thermometer of Celsius should be adopted as standard. The *micron* (0.001 mm.), represented by the Greek letter  $\mu$ , should be adopted as the unit of measure in microscopic work.

F.—The indication of enlargement or of reduction, which is very desirable for the comprehension of an illustration, should be expressed in figures rather than by mentioning the system of lenses used.

The indication of enlargement or reduction of an object is usually linear. The sign of multiplication is used for enlargement, and the fraction for reduction. Examples:  $\times 50$  indicates that the object is enlarged 50 times;  $\frac{1}{50}$  indicates that it is reduced to  $\frac{1}{50}$ th.

**At Article 5.**—The rule has been thus emended in order to preserve family names as far as possible without unnecessary change. A family name need not be derived from that of the oldest genus in the family.

Well-established family names are not to be changed even though the generic name from which the family name is derived has been sunk as a synonym, or a generic name older than that from which the family name is derived is included in the family. Examples: *Dryops*, synonym *Parnus*; family name to remain *Parnidae*. *Agaristidae* not to be changed to *Phalaenoididae* because of the inclusion in the family of the generic name *Phalaenoides*, which is older than *Agarista*.

**At Article 8.**—Generic names should, as far as possible, be brief, and they should not resemble superfamily names in termination.

The following words may be taken as generic names:

(a) Greek substantives, for which the rules of Latin transcription [transliteration (see below: *Transliteration of Greek Words*)] should be followed. Examples: *Anelys*, *Amphibola*, *Aplysia*, *Pompholyx*, *Physa*, *Cylichna*.

(b) Compound Greek words, in which the attributive should precede the principal word. Examples: *Stenogyra*, *Pleurobranchus*, *Tylodina*, *Cyclostomum*, *Sarcocystis*, *Phelodytes*, *Hydrophilus*, *Rhizobius*.

This does not, however, exclude words formed on the model of *Hippopotamus*, namely, words in which the attributive follows the principal word. Examples: *Philydrus*, *Biorhiza*.

(c) Latin substantives. Examples: *Ancilla*, *Auricula*, *Dolium*, *Harpa*, *Oliva*. Adjectives (*Prasina*) and past participles (*Productus*) are not recommended.

(d) Compound Latin words. Examples: *Stiliger*, *Dolabrifer*, *Semifusus*.

(e) Greek or Latin derivatives expressing diminution, comparison, resemblance, or possession. Examples: *Dolium*, *Doliolum*; *Strongylus*, *Eustrongylus*; *Limax*,

*Limacella, Limacia, Limacites, Limacula; Lingula, Lingulella, Lingulepis, Lingulina, Lingulops, Lingulopsis; Neomenia, Proneomenia; Buteo, Archibuteo; Gordius, Paragordius, Polygordius.*

(f) Mythological or heroic names. Examples: *Osiris, Venus, Brisinga, Velleda, Crimora*. If not Latin, these should be given a Latin termination (*Aegirus, Gëndulia*).

(g) Proper names used by the ancients. Examples: *Cleopatra, Belisarius, Melania*.

(h) Modern patronymics, to which is added an ending to denote dedication.

i. Names terminating with a consonant take the ending *ius, ia* or *ium*.

Examples: *Selysius, Lamarckia, Köllikeria, Mülleria, Stålia, Krøyeria, Ibañezia*.

ii. Names terminating with the vowels *e, i, o, u* or *y* take the ending *us, a* or *um*. Examples: *Blainvillea, Wyvillea, Cavolinia, Fatioa, Bernaya, Quoya, Schulzea*.

iii. Names terminating with *a* take the ending *ia*. Example: *Danaia*.

iv. In generic names formed from patronymics, the particles are omitted if not coalesced with the name, but the articles are retained. Examples: *Blainvillea, Benedenia, Chiajea, Lacepedea, Dumerilia*.

v. With patronymics consisting of two words, only one of these is used in the formation of a generic name. Examples: *Selysius, Targionia, Edwardsia, Duthiersia*.

vi. The use of proper names in the formation of compound generic names is objectionable. Examples: *Eugrimmia, Buchiceras, Heromorpha, Möbiussispongia*.

(i) Names of ships, which should be treated the same as mythological names (*Vega*) or as modern patronymics. Examples: *Blakea, Hirondeella, Challengeria*.

(j) Barbarous names, that is, names of nonclassic origin. Examples: *Vanikoro, Chilosa*. Such words may receive a Latin termination. Examples: *Yetus, Fossarus*.

(k) Words formed by an arbitrary combination of letters. Examples: *Neda, Clanculus, Salifa, Torix*.

(l) Names formed by anagram. Examples: *Dacelo, Verlusia, Linospa*.

In forming generic names from languages in which the Latin alphabet is used, the exact original spelling should be retained. Diacritic marks may be preserved. Examples: *Selysius, Lamarckia, Stålia, Krøyeria, Ibañezia*.

The prefixes *Sub* and *Pseudo* should be used only with adjectives and substantives, *Sub* with Latin words, *Pseudo* with Greek words, and they should not be used in combination with proper names. Examples: *Sublegatus, Pseudacanthus, Pseudophis, Pseudomys*. Words like *Subclymenia* and *Subnicoletia* are not recommended.

The termination *oides* and *ides* should be used in combination only with Greek and Latin substantives; they should not be used in combination with proper names.

Geographical and patronymic names from countries which have no recognised orthography or which do not use the Latin alphabet should be transcribed into Latin according to the rules adopted by the Geographical Society of Paris.

In proposing new names based upon personal names which are written sometimes with *ä*, *ö* or *ü*, at other times with *ae*, *oe* and *ue*, it is recommended that authors should adopt *ae*, *oe* and *ue*. Example: *Muelleria* in preference to *Mülleria*.

*Transliteration of Greek words.*—The following table indicates the manner in which Greek words should be transliterated :

	ε = e	(ὕαλος)	—Hyalea, not Hyalaea
	η = e	(πειρήνη)	—Pirena, not Pirina
final	η = a	(πειρήνη)	—Pirena, not Pirene
	θ = th	(τῆθύς)	—Tethys, not Tetys
	ι = i	(βαλίας)	—Balía, not Balea
	κ = c	(ἵπποκρήνη)	—Hippoerena, not Hippochrenes
	ξ = x	(ξένος)	—Xenus, Xenophora
	ρ = r	(πτερόν)	—Pterum
	υ = y	(ὕβός)	—Hybolithus, not Hibolites
	αι = ae	(λιμναῖος)	—Limnaea, not Limnea
	αυ = au	(γλαυκός)	—Glaucus
	ει = i	(χεῖλος)	—Chilostomum, not Cheilostoma
	ευ = eu	(εὐρος)	—Eurus
	οι = oe	(οἰκία)	—Dioeca, Dendroeca, not Dioica, Dendroica
final	ον = um	(εφίππιον)	—Ephippium, not Ephippion
final	ος = us	(ὀμφαλός)	—Euomphalus, not Euomphalos
	ου = u	(λουτήριον)	—Luterium, not Loterium
	γγ = ng	(ἀγγαρεία)	—Angaria
	γχ = nch	(ἀγχιστομον)	—Anchistomum, not Angistoma
	γκ = nc	(ἀγκιστρον)	—Ancistrodon, not Agkistrodon
	ῥ = rh	(ῥέα)	—Rhea
	ἑ = he	(ἑρμαία)	—Hermaea, not Ermaea

**At Article 11** (formerly Articles 14, 15, 16, and 20).—It is recommended that specific names should take one of the following forms :

(a) Adjectives, agreeing grammatically with the generic name. Example: *Apis mellifera*.

(b) Substantives in the nominative in apposition with the generic name. Example: *Attacus atlas*.

(c) Substantives in the genitive. Examples: *rosae*, *pavonis*, *antillarum*, *galliae*, *sancti-pauli*, *sanctae-helenae*.

If the name is given as a dedication to one or several persons, the genitive is formed in accordance with the rules of Latin declination in case the name was employed and declined in Latin. Examples: *plinii*, *aristotelis*, *victoris*, *antonii*, *elisabethae*, *petri* (given name).

If the name is a modern patronymic, the genitive is always formed by adding, to the exact and complete name, an *i* if the person is a man, or an *ae* if the person is a woman, even if the name has a Latin form; it is placed in the plural if the dedication involves several persons of the same name. Examples: *cuvieri*, *möbiusi*, *nuñezi*, *merianae*, *sarasinorum*, *boi* (not *bovis*), *salmoni* (not *salmonis*).

The best specific name is a Latin adjective, short, euphonic, and of easy pronunciation. Latinised Greek words or barbarous words may, however, be used. Examples: *gymnocephalus*, *echinococcus*, *ziczac*, *aguti*, *hoactli*, *urubitinga*.



In forming specific names from languages in which the Latin alphabet is used, the exact original spelling should be retained. Diacritic marks may be preserved. Examples: *čjžeki*, *spitzbergensis*, *islandicus*, *paraguayensis*, *patagonicus*, *barbadensis*, *faroënsis*.

It is well to avoid the introduction of the words *typicus* and *typus* as new names for species or subspecies, since the use of these names is always liable to result in later confusion.

The prefixes *sub* and *pseudo* should be used only with adjectives and substantives, *sub* with Latin words, *pseudo* with Greek words, and they should not be used in combination with proper names. Examples: *subviridis*, *pseudocryptus*. Words like *sub-wilsoni* and *pseudo-guadeloupana* are not recommended.

The terminations *oides* and *ides* should be used in combination only with Greek or Latin substantives; they should not be used in combination with proper names.

Geographical and patronymic names from countries which have no recognised orthography or which do not use the Latin alphabet should be transcribed into Latin according to the rules adopted by the Geographical Society of Paris.

In proposing new names based upon personal names, which are written sometimes with *ä*, *ö*, or *ü*, at other times with *ae*, *oe* and *ue*, it is recommended that authors should adopt *ae*, *oe* and *ue*. Example: *muelleri* in preference to *mülleri*.

The use of compound proper names indicating dedication, or of compound words indicating comparison with a simple object, does not form an exception to Article 2. In these cases the two words composing the specific name should be written as one word with or without a hyphen. Examples: *sanctae-catharinae* or *sanctaecatharinae*, *jan-mayeni* or *janmayeni*, *cornu-pastoris* or *cornupastoris*, *cor-anguinum* or *coranguinum*, *cedo-nulli* or *cedonulli*.

Expressions like *rudis planusque* cannot be used as specific names.

Geographical names should be given as substantives in the genitive, or placed in adjectival form. Examples: *sancti-pauli*, *sanctae-helenae*, *edwardsiensis*, *diemenensis*, *magellanicus*, *burdigalensis*, *vindobonensis*.

**At Article 14.**—The name of a subspecies cannot be used in the genus either for another species or for the subspecies of another species. "Names" of lower rank are not subject to this restriction, and therefore their existence does not invalidate their subsequent use for a species or subspecies even in the same genus, as they are not subject to the Law of Priority. Authors are, however, recommended not to use the "names" of well-known aberrations for new species or subspecies.

If a form of lower rank than subspecies is found to be either a species or a subspecies, the "name" it bears should be retained (unless there is some other objection to it), and would date from the time at which it attained the higher status, carrying with it the name of the author who made the change.

*The notation of hybrids* (formerly Article 18).—The notation of hybrids may be given in several ways; in all cases the name of the male parent precedes that of the female parent, with or without sexual signs:

(i) The names of the two parents are united by the sign of multiplication ( $\times$ ). Example: *Smerinthus ocellatus* ♂  $\times$  *Amorpha populi* ♀ and *Smerinthus ocellatus*  $\times$  *Amorpha populi* are equally good formulae.

(ii) Hybrids may also be cited in the form of a fraction, the male parent forming the numerator and the female parent the denominator. Example :  $\frac{\textit{Smerinthus ocellatus}}{\textit{Amorpha populi}}$ . This second method is preferable in so far that it permits the citation of the author who first published the hybrid form as such. Example :  $\frac{\textit{Smerinthus ocellatus}}{\textit{Amorpha populi}}$  Westw. 1843.

(iii) The fractional form is also preferable in case one of the parents is itself a hybrid. Example :

$$\frac{\textit{Smerinthus ocellatus} \times \textit{Amorpha populi}}{\textit{Amorpha populi}}$$

In the latter case, however, the parentheses may be used. Example :  $(\textit{Smerinthus ocellatus} \times \textit{Amorpha populi}) \times \textit{Amorpha populi}$ .

(iv) When the parents of a suspected hybrid are not known, the insect takes provisionally a specific name.

**At Article 15.**—The question of emendation of names has been one of the most difficult that have come up for consideration. Some authors, known as "purists," have insisted upon a classical Latin; others have accepted the original orthography of a name, be it good, bad, or indifferent. Names have been published in a form not altogether in accordance with classical rules, and later authors have emended them; unfortunately, the emending authors have not been in accord in regard to the emendations, and a given name may appear in literature in several "corrected" forms. It is stated, for instance, that one name has been "corrected" twenty-three different times. Unfortunately, also, the emendation of names occasionally leads to the rejection of names which might be retained if emendation were not admitted.

The family name *Sphegidae* has (according to the purists) been irregularly formed from its type genus *Sphex*, and should have taken the form *Sphecidae*. It is recommended that such a name as *Sphegidae* should not be rejected on this account, even though a correctly derived superfamily name *Sphecoidea* is in use.

**At Article 16.**—It is desirable to cite the author's name, together with the year of publication, where a scientific name is first mentioned in an article.

**At Article 17.**—It is recommended that for a work to qualify for validity under Article 17, it should bear the price and the publisher's name, and also the place and date of publication.

**At Article 18.**—It is strongly recommended that, in erecting a new genus, an author should cite a valid species as the genotype.\*

**At Article 20.**—Where an insect has been bred from a gall or mine to which a name has already been given, it is strongly recommended that the describer should give to it the name which has already been proposed for the gall or mine.

**At Article 21.**—In the absence of any previous revision, the establishment of precedence in the following order is recommended to first revisers :

\* Cf. p. 4 R herein : Internat. Zool. Congress, Budapest, amendment to Article 25 of original International Rules, 1926.

(a) A generic name for which a type has been specified has precedence over a name without such specification. If all or none of the genera have types specified, that generic name takes precedence the diagnosis of which is the most pertinent.

(b) A specific name accompanied by both description and figure stands in preference to one accompanied only by a diagnosis or only by a figure.

(c) Other things being equal, that name is to be preferred which stands first in the publication. When two names appear in two different volumes of the same date, that which has page precedence is to be preferred, provided that other things be equal.

**At Article 22.**—The meaning of the expression “select the type” should be rigidly construed. Mention of a species as an illustration or example of a genus does not constitute a selection of a type.

Species based upon sexually mature specimens should take precedence over species based upon larval or immature forms.

All other things being equal, preference should be shown to a species which the author of a genus actually studied at or before the time he proposed the genus.

In case of writers who habitually placed a certain leading or typical species first as “chef de file,” the others being described by comparative reference to this species, this fact should be considered in the choice of the type species.

To facilitate reference, it is recommended that when an older species is taken as type of a new genus, its name should be actually combined with the new generic name in addition to citing it with the old generic name. Example: *Rhondia*, Gahan, 1906, Faun. Brit. Ind. Coleopt. I. p. 79, type *Rhondia pugnax*, Dohrn = *Leptura pugnax*, Dohrn.

When there is a choice of species for selection as a genotype, one known to the author of the genus should be selected in preference to one known by description only, and, when possible, one which will retain the old generic name for the largest number of its known species.

**At Article 28.**—It is well to avoid the introduction of new generic names which differ from generic names already in use only in termination or in a slight variation in spelling which might lead to confusion. But when once introduced, such names are not to be rejected on this account. Examples: *Peronea*, *Peronaea*; *Petena*, *Peteina*; *Heterophyllus*, *Heterophylus*; *Fellea*, *Fellaea*, *Felloea*; *Autocera*, *Autocerus*.

The same recommendation applies to new specific names in any given genus. Examples: *necator*, *necatrix*; *furcigera*, *furcifera*; *rhopalocephala*, *rhopalioccephala*.

If from the radical of a geographical name two or more adjectives are derived, it is not advisable to use more than one of them as specific name in the same genus, but if once introduced, they are not to be rejected on this account. Examples: *hispanus*, *hispanicus*; *moluccensis*, *moluccanus*; *sinensis*, *sinicus*, *chinensis*; *ceylonicus*, *zeylanicus*.

The same recommendation applies to other words derived from the same radical and differing from each other only in termination or by a simple change in spelling.





# THE ENTOMOLOGICAL SOCIETY OF LONDON

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## THE FELLOWSHIP AND FEES.

Fellows pay an Admission Fee of £3 3s. The Annual Contribution of £2 2s. is due on the first day of January in each year, and is payable in advance.

All Fees should be paid to the Treasurer, Mr. W. G. Sheldon, at 41, Queen's Gate, S.W. 7, and *not to the Secretaries*.

Fellows desiring to pay their Annual Contribution through their bankers can obtain an official form of banker's order by applying to the Treasurer.

Fellows whose Contributions for the current year have been paid are entitled to receive the publications of the Society free of charge. Further copies may be purchased at reduced prices by applying to the Librarian.

Forms of application for Fellowship, copies of the Bye-laws and the List of Fellows may be obtained from the Secretaries.

## MEETINGS AND EXHIBITIONS.

Intending exhibitors are required to send in their names and the nature of their exhibits to the Secretaries *before noon* on the day of the meeting, in order that they may be called upon from the chair. Descriptive notes of all exhibits should be handed to the Secretaries *at the same meeting* for printing in the Proceedings. If the lantern is required, 24 hours' notice must be given.

Fellows resident abroad, or who are otherwise unable to attend, are reminded that any specimens, notes, or observations they may send to the Secretaries will be considered by the Council, with a view to exhibition or reading at the meetings of the Society.

## PAPERS AND ILLUSTRATIONS.

Fellows desiring to communicate papers to the Society must send the manuscript of such papers to the Transactions Secretary, Mr. N. D. Riley, Brit. Mus. (Nat. Hist.), Cromwell Road, London, S.W. 7, at least fourteen days prior to the date of the meeting at which it is proposed that such papers shall be read. Authors desiring their papers to be published in the Transactions must submit the manuscript, and proposals for illustrations, if any, to the Transactions Secretary at least fourteen days before the meeting of the Publication Committee at which it is desired such papers should be considered.

Authors proposing to illustrate their papers should communicate with the Secretaries before the drawings are executed. The size of the finished work on plates should be limited to  $7\frac{1}{2}$  ins. by  $4\frac{3}{4}$  ins., after allowing for reduction, if any.

Attention is called to the Instructions to Authors issued with Part I of each volume, which may also be obtained at the Office of the Society. Inattention to these regulations may involve an author in considerable expense.

## WANTED.

The Society is willing to purchase volumes or parts of the Transactions for the years 1907, 1908, and 1912.



# THE ENTOMOLOGICAL SOCIETY OF LONDON

## MEETINGS

TO BE HELD IN THE SOCIETY'S ROOMS

41, QUEEN'S GATE, S.W. 7

1928.

Wednesday, October	31
" " "	17
" " November	7
" " "	21
" " December	5

1929.

" " January (Annual Meeting)	16
" " February	6

*The Chair will be taken at Eight o'clock.*

## THE LIBRARY

is open to Fellows, and their friends when accompanying them, except during September, from 10 a.m. to 6 p.m., except on Saturdays, when it closes at 1 p.m. On the nights of meeting it remains open until 10 p.m.

## NOTICE

Fellows are informed that they can have their Transactions bound at the following prices by Mr. H. J. Hardy, 68, London Road, Croydon, the Society's bookbinder:

Cloth: old size, 4s. 3d.; new size, 5s.

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